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REPORT OF THE
STATE BOARD OF HEALTH
OF THE
STATE OF CALIFORNIA.

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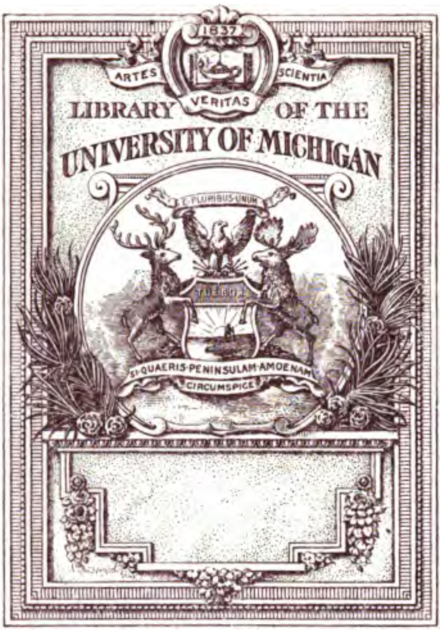

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SEVENTH REPORT

OF THE

STATE BOARD OF HEALTH

OF

CALIFORNIA,

From July 1, 1880, to December 1, 1881.

SACRAMENTO:
STATE OFFICE : : : J. D. YOUNG, SUPT. STATE PRINTING.
1882.

MEMBERS OF THE STATE BOARD OF HEALTH.

HENRY GIBBONS, Sr., M. D., President	San Francisco.
J. P. WIDNEY, M. D.	Los Angeles.
W. R. CLUNESS, M. D.	Sacramento.
CHESTER ROWELL, M. D.	Fresno.
C. C. MASON, M. D.	Chico.
C. W. BREYFOGLE, M. D.	San José.
F. W. HATCH, Sr., M. D., Permanent Secretary	Sacramento.

COMMITTEES OF THE STATE BOARD OF HEALTH.

1. Committee on the Salubrity of Public Institutions, Schools, Hospitals, Prisons, Factories, etc.:

Drs. Cluness, Widney, and Breyfogle.

2. On Statistics relating to Life and Health, Modes of Employment and of Living and the Comparative Healthiness of Different Localities:

Drs. Cluness, Widney, and Rowell.

3. On Intoxicating Liquors, Inebriate Asylums, Pathological Influence of Alcohol, etc.:

Drs. Gibbons, Mason, and Breyfogle.

4. Influence of Irrigation, Tree Planting, etc.:

Drs. Rowell, Widney, and Mason.

Of these Committees the Secretary of the Board is *ex officio* a member.

REPORT

OF THE

STATE BOARD OF HEALTH.

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REPORT OF THE STATE BOARD OF HEALTH.

To his Excellency GEORGE C. PERKINS, *Governor of California:*

The State Board of Heath have the honor of herewith presenting their Sixth Report.

It is a proper subject for congratulation, that the epidemic of smallpox, which prevailed more or less during the past two years in the metropolis, and for a certain time in a few other localities of the State, may be said to have expended its force, and to have almost, if not quite, disappeared from our midst.

When we consider the virulence of the variolous contagious principle, and the facilities afforded through constant intercourse with the chief center of its prevalence in this State along the various lines of travel, it has seemed somewhat surprising that it should not have been more generally disseminated; and this exemption is all the more noticeable in view of the additional, and even greater, danger of the widespread diffusion of the disease by means of the immigration flowing in upon us through the seaport cities of the Atlantic border, and from infected localities in States east of the Rocky Mountains. There can scarcely be a doubt that the measure of exemption realized has been mainly due to the general adoption of vaccination in all our cities, and in many of the country towns. At no period in the history of the State has this measure been so generally practiced. There seems to have been an almost universal recognition of its protective influence. That the energy with which it was prosecuted by the health authorities of the City of San Francisco, was the means of saving that city from a general and devastating epidemic there can be but little doubt; and it is not too much to say, that San Francisco is, at the present time, one of the best vaccinated cities in the United States.

Some interesting questions have arisen out of the presence of smallpox in the State, and the method of its introduction to localities in the interior. We have been brought face to face with several serious defects in our sanitary laws. They have been referred to at some length in the accompanying Report of the Secretary of the State Board of Health. One of these defects was seriously felt during the past Winter, when, for the protection of the State from the introduction of smallpox from eastern States, it was deemed prudent to institute a system of *inspection*, and, possibly, *quarantine*, of immigrant passengers near the State boundary. The absence of any law for such a procedure at once presented a serious difficulty, which was surmounted only by the prompt and liberal action of your Excellency in assuming an authority not written in the statutes, but dictated and warranted by the common law of self-protection. Fortunately, no serious obstacle was interposed by the railroad authorities; due, perhaps, to the very limited interruption of travel which became necessary. Should, however, circumstances have occurred requiring the frequent and more prolonged exercise of quarantine measures, it is not difficult to understand that a conflict might easily have arisen.

Such a contingency ought never to be possible. It is unsafe to trust, for the successful execution of sanitary measures, to the consent of individuals or corporations with whose special interests they may for a time seem to come into collision. Sanitary laws are intended to promote the greatest of all interests—the public health; and, while they should be so guarded as to protect all citizens and business interests from unnecessary or arbitrary interference, and to impose hardship and loss upon no person or corporation, they should be so clear and imperative in their action that their enforcement may not be endangered by opposition or caprice.

We respectfully refer you to the report of the Secretary for further remarks upon this important subject.

Your attention is respectfully called to the required amendments to the law concerning the registration of deaths, births and marriages, and to that establishing local Boards of Health. These laws are, at present, inefficient. Their importance justifies the careful consideration of the Legislature.

Again: There should be, as suggested in the report, an amendment to the School Law, requiring the vaccination of all children entering the public schools, not only of the cities but of all country districts, unless previously protected. By the strict enforcement of such a law, we might confidently look forward to a period by no means remote when there would exist in California a race of men in the presence of whom the contagion of variola would be bereft of its terrors, living witnesses of the efficacy of that simple discovery which gave immortality to the name of Jenner.

Among the various objects which invite the attention of the Government, none are more important, none calculated to be productive of greater general good, than those which relate to its sanitary interests. A step in the right direction was made when a State Board of Health was established. The organic Act creating this Board embraces the more important objects of sanitary investigation; it prescribes duties which, if faithfully performed, must give results highly conducive to the welfare of the State. Yet, while prescribing its duties, while pointing out the general direction and scope of its work, it has left it powerless to enforce its decrees. Its power is simply advisory—sufficient for all ordinary purposes in times of health, but signally inoperative and inefficient when danger threatens. Let it be supplemented by Acts embracing the general objects of sanitary legislation, conferring power when necessity demands its exercise. Thus only can its vitality be sustained, and the full purposes of its organization accomplished.

Presented for the State Board of Health.

F. W. HATCH, M. D.,
Permanent Secretary.

Sacramento, California, October 1, 1882.

FINANCIAL STATEMENT OF THE STATE BOARD OF HEALTH.

The following financial statement is respectfully presented:

APPROPRIATION AND EXPENDITURES

For "Mileage and Expenses of State Board of Health," for the thirty-second and thirty-third fiscal years, ending June 30, 1881 *and* 1882, *respectively.*

	THIRTY-SECOND FISCAL YEAR.		
April 16, 1880	Appropriation	$1,000 00	
July 1, 1880, to June 30, 1881	Amounts paid members of the Board (Controller's warrants)		$938 14
June 30, 1881	Balance of appropriation unexpended		61 86
		$1,000 00	$1,000 00
	THIRTY-THIRD FISCAL YEAR.		
May 12, 1881	Appropriation	$1,250 00	
April 15, 1882	Proceeds from sale of stove (paid in by Dr. Hatch)	20 00	
July 1, 1881, to June 30, 1882	Amount paid members of the Board on Controller's warrants		$702 78
June 30, 1882	Amount paid Dr. Rhodes, Quarantine Officer		280 00
	Other expense attached to quarantine service, viz: Purchase of stove and trimmings $51 50 Bedding and clothing 8 50 Drugs, vaccine matter, etc. 34 80 Supplies to quarantined passengers 125 50		220 30
April 15, 1882	Proceeds from sale of stove		20 00
June 30, 1882	Balance unexpended		46 92
		$1,270 00	$1,270 00

REPORT OF THE PERMANENT SECRETARY

OF THE

STATE BOARD OF HEALTH.

REPORT OF THE PERMANENT SECRETARY.

To the State Board of Health:

The last report which I had the honor to present brought up the statistics of mortality to July, 1880, it being in the nature of a special report, made necessary by the changes in the time of holding the Legislative sessions, brought about by the adoption of the new Constitution. The statistical portion of the present report will be made to conform to the plan previously adopted, and will include the full year ending December 31, 1881.

For the purpose, however, of filling the gap from July 1 to December 31, 1880, I have prepared an abstract of the deaths and their causes, in the several cities and towns, reporting to the State Board of Health, including the six months ending with that date. It is presented below in the form of a summary of the circulars issued about the tenth of each month. In it are shown the total mortality, and that by the principal diseases, for the period it embraces. These diseases belong principally to the zymotic class—that class over which climate and local conditions are thought to exert a more or less positive influence.

Twenty-two localities are reported in the following table, including the principal cities and towns, and a total population of 368,164, as per the census of 1880. The total mortality is given at 3,150, showing a death-rate per 1,000 per annum of about 13.36.

Of the different diseases recorded, consumption stands at the head, the deaths having been 511, and the death-rate 2.77. The acute diseases of the respiratory organs stand next, including pneumonia and bronchitis, the mortality being 248, and the death-rate per 1,000 per annum, 1.34. Diarrheal diseases show a mortality of 169, of which 108 are set down to cholera infantum. The death-rate of this class is 0.70.

By the contagious diseases, including diphtheria, we have 149 deaths, of which the latter is responsible for 30, and smallpox 51. The annual ratio of deaths per 1,000 is 0.60, while by diptheria alone it is 0.16, and by smallpox, 0.26.

The deaths by typhoid fever are 92, and by malarial fevers (typho-malarial and intermittent and remittent), 53. By the former the annual death-rate is 0.48, and by the latter, 0.28.

CIRCULAR OF THE STATE BOARD OF HEALTH.

Abstract of the Reports of Deaths and their causes in the following Cities and Towns of California during the six months ending December 31, 1880.

Cities and Towns.	Prevalent Diseases.																					Authorities.
	Total Deaths	Consumption	Pneumonia	Bronchitis	Other Diseases of Lungs	Diarrhea and Dysentery	Cholera Morbus and Cholera Infantum	Other Diseases of Stomach and Bowels	Diptheria	Croup	Scarlatina	Measles	Smallpox	Whooping-Cough	Typho-Malarial Fevers	Typhoid Fever	Remittent and Intermittent Fevers	Cerebro-Spinal Fever	Alcholism	Erysipelas	Months Reported	Death Rate per 1,000 per annum	
San Francisco	2,202	386	147	19	20	33	69	49	23	11	6	13	43	25	6	56	18	12	27	5	6	18.82	Board of Health.
Sacramento	193	13	13	1	2	2	7	3	7	1	3			3	1	12	3	3	1	1	6	18.02	Board of Health.
Stockton	42	6		1		2		3					4								4	12.24	Dr. A. T. Hudson
Marysville	64	11	13	2		1		2								2	8		1	1	6	21.73	Dr. A. B. Caldwell.
Placerville	16	1	1					4								2	1				5	19.68	Dr. E. A. Kunkler.
Santa Barbara	38	7	1			2		1								4					6	21.96	Dr. C. B. Bates.
Los Angeles	126	23	5	2	3	7	3	5	1			3				3	2	2			6	22.27	Board of Health.
St. Helena and vicinity	20	4					1	1				1									6	12.56	Dr. W. J. G. Dawson.
Folsom	7		4																		5	11.19	Dr. F. C. Durant.
Merced	14	3	2		1		2	2								1					5	11.18	Dr. H. N. Rucker.
Williams	4						1		1												3	6.40	Dr. H. C. Crowder.
Downieville and vicinity	5		1				1												1		6	7.14	Dr. Alemby Jump.
Antioch	5	1				1										1	1				6	4.00	Dr. M. C. Parkison.
Sonoma and vicinity	6	1																			6	8.00	Dr. G. M. Wells.
Santa Rosa	37	3	2				5	3						1					2	1	6	12.84	Dr. W. Winlaw.
Vallejo	31	7	7		3	3	1	2				1		1			1	1			6	9.56	Dr. James Frost.
Shasta	6		1					1												1	4	8.00	Dr. J. M. Briceland.
San Bernardino and vicinity	18	4				3										1	3				5	10.63	Dr. W. R. Fox.
Ventura County	20	5						3			1					1	1	1			6	7.14	Dr. F. Delmont.
Chico	47	2	7	1			9	2							1	1	1	3			6	18.80	Dr. C. C. Mason.
San Mateo County	37	13	2		1		2										1	1	4	1	6	29.60	Dr. C. A. Kirkpatrick.
Oakland	212	21	10	6	1	7	7	7	3	1	1	1	4	6	3	8	2		1	1	6	12.27	Board of Health.
Totals	3,150	511	216	32	31	61	108	88	30	13	11	19	51	36	11	92	42	23	37	11			

EPIDEMICS.

Previous to October, 1880, no disease prevailed to a sufficient extent to entitle it to be called an epidemic. A few cases of scarlatina had occurred in Sacramento, Ventura County, and Vallejo, but they were isolated in character. The disease appeared for the first time in the mortality table, in August, with one death—Sacramento; again in October with three deaths—one in Sacramento, one in San Francisco, and one in Ventura County. The mortality bulletin issued October tenth, contained also the following:

> Smallpox, which made its appearance in San Francisco, Oakland, and Stockton some months ago, but limited to isolated cases, or to special localities, seems to have received a new impulse, and to have become at least feebly epidemic in the former of these cities. Cases have also been recently reported by the press in Oakland, and one in San Jose; one death occurred during the present month, November, at the pest-house near Sacramento, the patient having been brought here from the mountains. While there is no present need of very great alarm, the lessons of the past teach us the importance of being prepared for its approach and of meeting it by the only effectual prophylactic known to medical science.

In the following month (November) the only death by scarlatina was reported from San Francisco, though the "reports of sickness" mentioned it as lingering mildly in Sacramento. By these reports diphtheria, though presenting a mortality of only 2, was ascertained to prevail to some extent in nearly all localities from which such reports were received. It was said in the bulletin for that month to be more or less prevalent in Colusa County, in Ventura County, in San Bernardino, in Redwood City, in Downieville, in Sacramento City, and Folsom. Five cases, with 2 deaths, have been reported by Doctors Rickey and Crowder, in Indian Valley, and it is said to have assumed a severe form in other parts of Colusa County, from which no regular reports are received. Smallpox, the same bulletin referred to as follows:

> Smallpox, mentioned in the last circular as having appeared in San Francisco and some other towns; continues to prevail. Notice has been received of it from Stockton, the vicinity of St. Helena (a single case of varioloid), Jackson, Amador County, and at Willows, in Colusa County. One case is also reported in Sacramento County. There seems to be an evident disposition for the disease to extend to the interior of the State, and the communication with San Francisco constantly going on from almost all parts of the State, certainly affords ground for apprehension. The importance of vaccination, the only protection known to medical science, cannot be too often or too strongly urged.

The deaths by this disease were 9: 8 in San Francisco (to the 26th), and 1 in Willows. Three deaths had previously been reported in Oakland, and 4 in Stockton.

Measles was for the first time (November) reported in the mortality table with five deaths, while its prevalence was known at Sacramento and Vallejo. Later on, in the following year, it will be shown to have become widely prevalent in many sections of the State.

Smallpox was represented by 12 deaths, of which 10 occurred in San Francisco during the four weeks ending December 24th, 1 in Oakland, and 1 in or near St. Helena. In the same month there were 5 deaths by measles, 3 being in Sacramento, and 2 by scarlatina. It was also reported prevalent at Vallejo.

Up to the close of the year the number of deaths by smallpox known to have occurred, though they are not all reported in the bulletin, was 53—of which 43 were confined to the metropolis.

A more extended notice of this disease, as it occurred in California, will be given in another part of this report.

REVIEW OF 1881.

The year 1881, while presenting only a small mortality, possesses a somewhat interesting history. During the year smallpox, to which reference was made in the comments on the mortality table for 1880, continued to prevail more or less in the metropolis, from time to time appearing in localities in the interior of the State, rendering the adoption of unusual precautions necessary. Then, again, measles, which was shown to have occasioned five deaths at the close of the last year, ultimately spread over a very large portion of the State.

The total mortality for the year, in the thirty-one localities reporting, including the principal cities of the State, is shown to have been 6,226; the rate per 1,000 of population being 13.65. The enumeration of population is based, where practicable, upon the United States census of 1880. In other cases the most reliable estimate obtainable has been adopted. It is believed to fall rather below than above the true condition, a number of the localities having considerably increased in population from the middle of 1880 to that of 1881. The total population represented is 404,464. Of the deaths, 899 belong to the zymotic class, 1,474 to that of constitutional diseases, 2,321 to local diseases, 206 to the developmental class, and 1,326 to external causes, including causes unclassified.

Of the deaths classified as zymotic, 190 belong to the miasmatic division or order, 23 to the enthetic order, and 86 to the dietic order. To the last order properly belong a considerable number of the cases given under the title of marasmus, in the next class, as they include deaths by inanition or innutrition; they could not, however, be separately classified in this report.

Under the first order, we find typhoid fever to have occasioned 179 deaths—more than any other single cause. Cholera infantum ranks next, with 121 deaths. Diphtheria next, with 87 deaths. Including the latter with the three principal contagious fevers, we have a total of 206, or 87 by diphtheria, 75 by smallpox, 26 by scarlatina, and 18 by measles—nearly 23 per cent. of the total by the zymotic class.

Diarrheal diseases claimed 21.58 per cent.; the fevers, 32.7 per cent.; whooping cough, 3.7 per cent.; and croup, 4.56 per cent. There is doubtless an uncertainty as to the real distinction between the cases designated as croup and those set down as diphtheria. Diphtheria affecting the larynx and trachea, without much involvment of the fauces, is not readily distinguished from true croup. The prominent symptoms and the fatality are the same. There is, in fact, strong reason to believe that the two diseases are identical.

The causation of diphtheria is often obscure. The following history of cases occurring in Grass Valley, a mountain town, will not be without interest in this connection, as indicating the probable relationship of the disease with impure and sewage-contaminated water. One of the cases referred to was seen by the writer with Dr. W. C. Jones, in March, 1881—a little girl about fourteen years of age—proving rapidly fatal, making five cases to that date. In this family, four cases had previously occurred within a period of eight or ten years; and, one week after her death, a brother, aged six years, was attacked, and died in about two weeks. This was the sixth case. It is a significant fact, pointing to the existence of a local cause, that at no time when diphtheria occurred in this family did it prevail in other portions of the town.

The house is isolated. Just outside the rear door is the well, open at the top, and bricked up from the bottom with loose bricks. It is built upon a hillside, the soil being red and gravelly, covering, about a foot below, a sandstone bedrock. Sixty or eighty feet above the well is the privy, a shallow vault excavated to the depth of the bedrock, its direction from the well being precisely that of the "dip" or trend of the bedrock. Between the privy and well is the woodhouse, used also as a receptacle for refuse of different kinds; and around this is a shallow ditch to catch the surface water as it runs down the hill during the rainy season, this ditch or trough being about three feet from the well, permitting the easy percolation of its retained water into the well, as also that which overflows the trough during the heavy rains.

The relative positions of the well and privy, the shallowness of the latter, the depth and character of the soil resting upon a rocky foundation, the inclination of the latter being towards the well, and the occurrence of diphtheria in this isolated house, at a time when none prevailed elsewhere in the town, seems to render the inference of well-water contamination, and its agency in the causation of the disease, very probable. Such examples teach a lesson often repeated, but seldom heeded.

Of the 87 deaths reported as having been occasioned by diphtheria, four were under one year of age, and forty-eight from one to five years; total, under five years, 52.

The prevalence of measles during the year has been mentioned. It appeared in a number of localities, indicated rather in the "Reports of sickness" than in the mortality table. The number of deaths reported is eighteen, though it is possible that some of the deaths, attributed to pneumonia, were only such as were secondary to measles. The deaths, under 1 year of age, were 6; from 1 to 5, 8; total, under 5 years, 14. In some of the localities, from which this disease was reported, it was associated more or less with Rötheln or German measles, either antecedently, or at the same time. So prominently, indeed, was this relation of the two diseases observed, and so frequently one followed the other in the same individual, that it became a common observation among the citizens of Sacramento, for example, that their children had been subjected to two attacks of measles within a few weeks. The same thing was noticed among adults. It differed from measles in the earlier appearance of the symptoms, the more round or oval form of the latter, and its shorter duration, generally in the milder character of the catarrhal symptoms, though in some cases, bronchitis was a prominent accompaniment. Desquamation was not noticed. Sore throat was common. The febrile symptoms varied in intensity and duration, usually milder and more transient than in measles; not infrequently the eruption was the first evidence of disease. It was contagious, one attack being protective against another, but not against measles. It was not confined to children, but attacked many adults, who, having had measles in youth, were surprised that they should again suffer with what they considered the same disease. I am not aware of any deaths occurring by it. The epidemic ran on during the early months of 1882, and was, indeed, more general then; as before stated, in some localities it was antecedent to measles, in others coincident with it.

Scarlatina appeared sporadically in a few localities, but nowhere as an epidemic during the year. The deaths were 26 in number, of which 12 were reported from San Francisco. Two deaths were recorded under 1 year of age, and 19 from 1 to 5 years; total under 5 years, 21.

Seventy-five deaths by smallpox were reported by correspondents to this office, and appear in the table. Deaths under 1 year of age, 8; from 1 to 5 years, 15; total under 5 years, 23. Other cases of this disease occurred, not regularly reported; they will receive attention further on.

Croup is assigned as the cause of 41 deaths, 21 being in San Francisco; under 1 year of age, 10; 1 to 5 years, 23; total under 5 years, 33. Seven cases were recorded as being between 5 and 10 years of age, and 1 between 20 to 30. The possibility of an error in diagnosis here has been noticed. This would appear especially so of the eight cases over five years of age. Croup is more particularly a disease of early childhood.

Whooping cough is made responsible for 34 deaths; under 1 year, 13; 1 to 5 years, 12; total under 5 years, 31.

Diarrheal diseases. The total mortality by these diseases, including cholera infantum, was 189. Cholera infantum alone occasioned 121 deaths. The deaths under 1 year were 121; from 1 to 5 years, 40; total under 5 years, 161. The "Sickness Reports" mentioned the considerable increase of these diseases in April. In Sacramento there was observed a strong tendency to gastric and enteric troubles. In June they were reported from almost all the localities from which "sickness" cards were received. The same was true of July, when there were recorded in the bulletin of the month 24 deaths by cholera infantum alone. In August they exhibited a decided decrease, but rose during September and October, to fall again during the last two months of the year.

Typhoid fever was the cause of 179 deaths; under 1 year, 2; 1 to 5 years, 14; total under 5 years, 16. Of the total mortality 90 occurred in San Francisco. The efficient Health Officer of San Francisco, Dr. Meares, has repeatedly called the attention of the city authorities to the insanitary conditions prevalent there. They consist mainly in defects of sewerage, which could be easily corrected, but which, neglected, must continue to be the predisposing, if not the exciting cause, of enteric fever. That officer speaks of them as "*continuous cesspools*, miscalled sewers, choked up, and in many instances filled with decaying animal and vegetable matters, distilling poisonous gases, which, through defective house drains, with no proper ventilation, sometimes without traps, and seldom with efficient ones, penetrate our houses, carrying with them disease and too often death." Yet the location of San Francisco is one in which it would seem that the engineer could most easily demonstrate his skill in the construction of an efficient and faultless sewerage system.

Outside of San Francisco 89 cases were reported; 12 in Sacramento, 14 in Oakland, 10 in San José, and 18 in Los Angeles. It is quite probable that a certain number of the deaths so classified belong rather to the typho-malarial fever. It is the general opinion among medical men, especially in the valley districts, that true enteric fever, having its characteristic lesion, is not common there. Its history, as met with, does not correspond as to causation or progress with the more specific disease. Throughout the greater part of California, particularly in the valley portions (Sonoma valley excepted) and in the foothills of the Sierra Nevada, the malarial influence modifies almost all of the febrile diseases met with. Other exceptions are noted in some of the coast cities—as at San Diego, Santa Cruz, Monterey and Santa Barbara. A general recognition of this fact and of the distinctiveness of the two forms of fever would simplify the classification, and give greater accuracy to the records. It would also serve, by placing each case in its proper nosological position, to solve the doubt, entertained by many, as to the necessary origin of true typhoid fever from its specific germ. The malarial forms, including typho-malarial and remittent and intermittent fevers, occasioned 66 deaths, of which 28 belong under the head of typho-malarial. This latter caused three deaths between 1 and 5 years of age; by remittent and intermittent form there were 3 under 1 year, and 7 from 1 to 5 years; total under 5 years, 10. Seventeen of the former were in localities outside of San Francisco, and 30 of the latter.

In the second order of zymotic diseases—the enthetic—we find syphilis, with 23 deaths; under 1 year, 7; 1 to 5 years, 3; total under 5 years, 10. These ten cases were doubtless hereditary or congenital, in which the sins of the fathers were visited upon the children.

The third order of the second class includes alcoholism alone, although, as previously remarked, some of the cases recorded under marasmus properly belong here.

Eighty-six deaths are reported by alcoholism, including delirium tremens and intemperance, fifty-six being of foreign birth. Fifty-one were reported from San Francisco. Forty-three were between 30 and 50 years of age—in the prime of life. Two are reported as being under one year of age; but of these no history is given.

CONSTITUTIONAL DISEASES.

The total recorded mortality by this class is 1,474; and under 1 year of age, 275; 1 to 5 years, 52; total under 5 years, 327.

Under the first order of this class—the diathetic diseases—we find only cancer, of which 175 deaths were reported, 84 being males, 89 females, and two unascertained (not given). The number of foreign birth is large—134, or more than 76 per cent. of the total. Only nine were born on the Pacific Coast. The aggregate of deaths is large, being nearly 29 per 1,000 of the mortality by all causes. In England, in 1876, the rate was 23 in every 1,000 deaths.

The second, or tubercular, order is of especial interest, not only on account of the diseases it includes, but also the number of deaths. In it we find 1,012 deaths, exclusive of marasmus, which is an uncertain term, and under which, as previously remarked, a very considerable number of the deaths must have been so recorded as the result of a faulty diagnosis. Probably many of them belong to the fourth order of the fourth class—diseases of nutrition. Adding these, however, as belonging to the nosological title of tabes mesenterica, 259 in number, we have a total of 1,371; 220 per 1,000 of the total deaths by all causes.

Of this large mortality, hydrocephalus gives 36; tubercular meningitis, 38. Of the former 15 died under 1 year of age; 19 between 1 and 5 years; total under 5 years, 34. Of the latter, 12 were under 1 year; 16 between 1 and 5 years; total under 5 years, 28.

Phthisis claims attention with 931 deaths; under 1 year, 14; 1 to 5 years, 9; total under 5 years, 23. The largest mortality was between the ages of 20 and 30—265; the next, 20 to 30—247. Of the nativities 156 were natives of the Pacific Coast, 286 of the Atlantic States, and 484 of foreign countries, with 5 unascertained. The record as it appears, without explanation, does injustice to some of the localities reporting. Such are the different health resorts of the State, places considered to be favored by climatic advantages, which for this reason become the refuge of the sick. Such, in truth, is the history of all sanitaria open to the public. Excluding San Francisco, which returned 596 deaths by phthisis, we have 335 due to interior towns and districts. Of these Los Angeles, Santa Barbara, St. Helena, San Bernardino, Ventura County, Lakeport, and Colfax, are responsible for 99. Los Angeles alone reports 55 deaths, or over 21 per cent. of its total mortality which without this explanation, might reflect injuriously upon the adaptability of its climate to chronic pulmonary complaints. Such a death-rate by consumption by no means belongs to the legitimate population of the town.

Some explanation is due, besides, to San Francisco, with its 596 deaths by this one cause. Though the climate of the place is not to be recommended for consumptives, it is naturally the rallying point for the very large number of invalids who reach California at too late a period of disease to be benefited by climatic influences, and who are compelled to struggle not only against disease, but against poverty and want. For such, the well provided hospitals of that city become a most acceptable refuge.

Of the deaths by phthisis among the natives of the Pacific Coast are to be included those dying under five years of age, probably as the result of direct hereditary taint. A considerable number, too, were among the native Mexican or half-breed population of the southern counties. It would be interesting to know precisely how many belonged to this class. The reports received do not reveal this in a manner available for statistical analysis. Again, it would be desirable to know how many of those born on the Pacific Coast, and who died of consumption, were the offspring of those who had come here for the benefit of their health, or who had themselves died of phthisis—the victims of hereditary influence. These facts must be known before we can form any conclusion as to the conservative influence of our climate. Information obtained from different sources, yet not sufficiently connected or definite to form the basis of positive proof, lead to the belief that this influence is altogether beneficial, and that of the youth born and reared here, and who have attained the age at which hereditary disease would be likely to manifest itself, comparatively few have as yet shown any signs of phthisical development. This is evidently true of those raised in localities presenting favorable climatic conditions.

LOCAL DISEASES.

Among the third class, order 3, pneumonia and bronchitis arrest attention as the cause of a large number of deaths—599; under 1 year, 98; 1 to 5 years, 98; total under 5 years, 196. The "sickness" reports received seem to indicate some relation between the meteorological condition and these diseases. In January, during the rainy season, with its humid atmosphere, pneumonia was reported prevalent in several localities, and epidemic in Vallejo, and in or near Redwood City, in San Mateo County. In February, with the continuance of similar climatic conditions, the same reports were made, with the addition of Woodland, where it was epidemic as a sequel of measles. March—the same. During this time, bronchitis was generally prevalent, and influenza reported from nearly all the localities heard from.

From April to September, there was a marked decrease in the prevalence of these diseases. In September, with its warm days yet chilly nights, and gradually increasing atmospheric humidity, the disease again more generally developed itself, and thus continued to the end of the year. During these latter months, both pneumonia and bronchitis occupied prominent places in the mortality table.

The fourth order of this class includes the diseases of the digestive organs, with a mortality of 437; under 1 year of age, 92; 1 to 5 years, 41; total under 5 years, 133. Of the total at all ages, 178 were of foreign nativity—nearly 41 per cent.

DISEASES OF THE NERVOUS SYSTEM.

The first order of the third class reveals the fact of 718 deaths; under 1 year, 185; 1 to 5 years, 131; total under 5 years, 316. Of the total, 166 were by convulsions, and of these, 113 were under 1 year of age, and 43 from 1 to 5 years, leaving only 10 for ages above 5. More than 11 per cent. of the mortality by all causes during the year are recorded as dying of diseases of the nervous system. The mortality was confined mainly to the large cities. Thus there were reported from San Francisco, 540; Sacramento, 37; Oakland, 48; San José, 25; Los Angeles, 21, and Marysville, 11; total, 682, or 95 per cent. Arranged according to the nativities, 355 were born on the Pacific coast, 125 Atlantic, 231 foreign, and 7 unclassified.

Speculation upon the causes of this large mortality is idle, without reliable data, yet it affords a theme in the consideration of which the imagination might easily find exhaustless occupation.

In the third class, second order, we find heart disease and aneurism credited with 369 deaths, of which 314 are due to the former cause. By the same cause, we have under 1 year, 18; 1 to 5 years, 10; total under 5 years, 28. Of the nativities there were: of heart disease, 171, of foreign birth, and of aneurism, 33; or 54.5 per cent of the total deaths by the former, and 60 per cent of the latter. The deaths by heart disease include 63 born on the Pacific Coast, of whom 48 were under 20 years of age. The deaths by these two causes are not much in excess of what is observed as the average for three years, at least, in some of the principal cities from which complete and reliable returns have been received.

In 1877, there were in San Francisco 224 deaths by this class; in Sacramento, 9; in Marysville, 3; in Los Angeles, 9; total, 245.

In 1878, San Francisco gave 251; Sacramento, 19; Marysville, 6; and Los Angeles, 13; total, 289.

In 1881, San Francisco, 241; Sacramento, 14; Marysville, 7; and Los Angeles, 16; total, 278; average for three years, 270.6.

DEVELOPMENTAL DISEASES.

In the second order of the fourth class, we find puerperal diseases alone. The deaths number 46; 8 representing natives of California and 25 foreigners.

In the third order, we have deaths by old age numbering 160; 9 being Californians by birth, and 109 of foreign birth. One hundred and nine of the decedents are reported from San Francisco, and of the remaining 51, 31 are recorded in five cities which contain a considerable Mexican or half-breed population. Thus, Los Angeles returns 8, Santa Barbara, 6, San Bernardino, 5, Ventura County, 4, and San José, 8. Some of the old Mexican population live to an extreme age. Several instances have been reported from Los Angeles. During the year under review one Gabriel is reported to have died at the age of 120 years; another at 102 years. Such extreme ages are to be accepted with some degree of allowance for error. It is sufficient to admit the fact that some of them do live to a great age, having attained maturity before the settlement of the country by the Americans. The pertinent question arises: Will the same be said of those among them now growing up to adult age? Or will the new circumstances in which they are placed, the new associations which surround them, and the habits of dissipation they have acquired, fit them rather to become the early victims of disease?

For further information concerning the mortality of 1881, the reader is referred to the accompanying tables:

TABLE NO. 1.

Report of Deaths, arranged according to Diseases, Sexes, Ages, and Nativities, from January 1 to December 31, 1881.

Causes of Death.	Total	Sexes.			Ages.										Nativities.			
		Male	Female	Unascertained	Under 1 year	1 and under 5 years	5 and under 10 years	10 and under 20 years	20 and under 30 years	30 and under 40 years	40 and under 50 years	50 and under 60 years	60 and under 100 years	Unascertained	Pacific States	Atlantic States	Foreign Countries	Unascertained
I.—Zymotic or Epidemic.																		
Cholera Morbus	6	6					1				2	2	1			4	2	
Cholera Infantum	121	63	55	3	93	26								2	119	1		1
Diarrhea	39	25	10	4	21	8		1		1	1		4	3	30	3	4	2
Dysentery	28	17	10	1	7	6		2	4	1	3	3	1	1	13	7	7	1
Smallpox	75	51	23	1	8	15	9	3	20	7	5	3	2	3	38	13	23	1
Measles	18	5	11	2	6	8	1						1	2	10	6	2	
Scarlatina	26	12	14		2	19	5								26			
Diphtheria	87	40	45	2	4	48	28	4		1			1	1	73	10	4	
Croup	41	29	12		10	23	7			1					38	2	1	
Whooping-Cough	34	14	18	2	13	18	3								32	2		
Erysipelas	19	11	8		4					3	4	2	5	1	3	3	13	
Fevers—Typhus, Malarial	28	12	15	1		3	3	4	9	3	2		3	1	9	4	15	
Typhoid	179	92	85	2	2	14	13	31	55	26	7	11	8	12	67	42	70	
Remittent and Intermittent	38	25	10	3	3	7	2	3	5	2	2	5	7	2	17	10	11	
Cerebro-Spinal	49	22	25	2	11	17	10	2		5	1	1		2	36	6	7	
Syphilis	23	13	10		7	3			4	5	2	2			9	2	12	
Alcoholism (direct or remote) including Delirium Tremens	86	60	21	5	2				7	21	22	10	10	14	5	20	56	5
II.—Constitutional Diseases.																		
Hydrocephalus	36	15	21		15	19		1			1				33	2	1	
Tubercular Meningitis	38	21	15	2	12	16	2	1	1	4		1		1	30	3	5	
Phthisis Pulmonalis	931	562	365	4	14	9	8	74	247	265	162	92	39	21	156	286	484	5
Marasmus	259	129	130		231	8		2	3	2	2	5	5	1	237	9	13	
Scrofula	7	5	2		2			2	1	1	1				3	2	2	
Rheumatism and Gout	28	17	11		1			2	5	3	5	7	5		4	10	14	
Cancer	175	84	89	2				1	9	24	49	44	43	5	9	32	134	

TABLE No. 1—Continued.

CAUSES OF DEATH.	Total	SEXES.			AGES.										NATIVITIES.			
		Male	Female	Unascertained	Under 1 year	1 and under 5 years	5 and under 10 years	10 and under 20 years	20 and under 30 years	30 and under 40 years	40 and under 50 years	50 and under 60 years	60 and under 100 years	Unascertained	Pacific States	Atlantic States	Foreign Countries	Unascertained
III.—LOCAL DISEASES.																		
Pneumonia	494	316	175	3	66	79	18	26	42	64	59	56	67	17	181	97	214	2
Pleurisy	5	3	2	----	----	----	1	----	2	----	----	----	2	----	1	----	4	----
Bronchitis	105	60	44	1	32	19	4	----	6	7	5	12	19	1	56	11	38	----
Other Diseases of Respiratory Organs	98	62	35	1	15	15	3	1	11	13	15	12	12	1	34	19	43	2
Enteritis	91	55	36	----	33	10	3	6	6	12	13	5	3	----	53	10	28	----
Gastritis	62	34	28	----	20	5	----	3	5	3	9	7	10	----	26	10	25	1
Gastro-Enteritis	26	11	15	----	7	5	1	2	3	3	2	3	----	----	16	3	7	----
Peritonitis (non-puerperal)	51	16	34	1	1	3	----	5	10	14	10	5	3	----	9	12	29	1
Diseases of the Liver	101	60	41	----	3	2	2	1	4	20	27	24	16	2	9	33	58	1
Other Diseases of Stomach and Bowels	106	58	47	1	28	16	8	8	5	4	10	13	12	2	61	14	31	----
Bright's Disease and Nephritis	97	67	28	2	----	1	1	7	14	21	13	12	26	2	10	41	45	1
Aneurism	55	49	3	3	----	----	----	----	3	11	16	16	5	4	----	21	33	1
Heart Disease	314	198	113	3	18	16	5	15	26	41	55	60	70	14	63	78	171	2
Convulsions	166	86	80	----	113	43	4	----	1	1	2	1	1	----	152	8	6	----
Other Diseases of Brain and Nervous System	552	348	203	1	72	88	18	27	29	62	72	88	93	3	203	117	225	7
IV.—DEVELOPMENTAL DISEASES.																		
Puerperal Diseases	46	----	46	----	----	----	----	3	18	18	4	----	----	3	8	12	25	1
Old age	160	78	82	----	----	----	----	----	----	----	----	4	153	3	7	40	109	4
V.—EXTERNAL CAUSES.																		
Suicide	96	83	12	1	----	----	----	6	14	25	22	12	15	2	11	24	60	1
All other causes not classified	1,230	868	350	12	172	79	27	58	166	239	172	126	128	63	310	196	680	44
Totals	6,226	3,782	2,379	65	1,048	642	187	301	735	933	777	644	770	189	2,207	1,225	2,711	83

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TABLE NO. 4.

Showing the total Deaths by twenty-three Principal Diseases in localities which have reported over six months in the year, together with the Deaths under one year and under five years of age—1881.

LOCALITIES.	Total Deaths	Deaths under one year of age	Deaths under five years of age	Cholera Infantum	Cholera Morbus	Diarrhea and Dysentery	Smallpox	Measles	Scarlatina	Diphtheria	Whooping-Cough	Croup	Erysipelas	Typhoid Fever	Malarial Fever	Typho-Malarial Fever	Cerebro-Spinal Fever	Tubercular Meningitis	Consumption	Acute Pneumonia	Acute Bronchitis	Pleurisy	Heart Diseases	Aneurism	Cancer	Alcoholism	Number of Months Causes Reported
San Francisco	4158	768	364	56	1	30	68	9	12	53	14	21	11	90	8	11	30	9	596	324	71	2	199	42	128	51	12
Sacramento	355	51	30	7	1	5		1		15		4	1	12	5	8	3	4	40	30	5		13	1	5	4	12
Napa	44		10			1					1	1		3	1				6	4	2	1	3			1	12
Oakland	379	76	42	7	1	7	1	1	1	5	6	4	4	14	1	4	2	7	55	30	6		26	3	13	3	12
San José	207	32	23	7		1				2	2	3		10	1			3	52	12	5		13	2	5		12
Vallejo	83	13	16		3	1			9		5		1	2				1	10	4	2		5	2	2		12
St. Helena	42	4	3	3		1	4							3			1	1	9	6	1	1	2			1	12
Los Angeles	267	31	49	8		5		1	4	3		1		18	10	3		6	55	11	7		15	1	8	2	12
Downieville	14	2	3	2										1					2	2						2	12
Santa Rosa	48	8	3	1		1	1			1	1			1			1		12	7			3		1		10
Santa Barbara	71	19	9			6								5					10	5			3		2		12
Chico	65	17	10	16							2	1		3					9	8					1	3	11
Folsom	18	1	2	1		1							1		2	1				1	1					1	12
Antioch	14	4	9	1		2				3	2			2							1						12
Merced	28	2	2																6	1	2		1			1	10
Marysville	92		14	3										2	10		1		17	19	1		7		2	2	12
San Mateo	39	4	7	3										1					7	6			1			2	8
San Bernardino	43	2	5			2						4	1						9	3	1	1	2		4		11
Shasta	22		4			1				2							1	1	1	1			5	2	3	4	12
Nevada City	39	2	4	2		1								3			1	1	5	3			4	1		2	9
Lakeport	12		3																1	1			1				8
Grass Valley	20	2	4					5		1				3									3				8
Colfax	16	2	2	1															1	3						4	10
Santa Cruz	17	3	3	1										1				3								2	7
Dixon	13	1	6				2				1						2	1	1	1			1			1	7
Williams	6		1			1									1				1								

COUNTY HOSPITALS.

I am compelled again to allude to the small number of hospitals from which reports have been received. Blanks were sent at an early date to all known hospitals, but from some of the most important no reply has been received. Among these is the large and well conducted hospital of San Francisco. All these institutions possess more than a local interest. They are capable of furnishing facts interesting to the entire State. They are the only possible medium through which we can obtain a knowledge of the prevalence of disease in many portions of the State. They reflect, to some extent, the consideration paid to the unfortunate class of patients who commonly resort to them, by the people of the State, and the provision made for their care. They teach us, in a general way, the number of indigent sick among us, the classes of disease from which they suffer, and the death rate. Yet, of the different hospitals only seventeen have forwarded a report.

TABLE No. 1.

Report to the State Board of Health of the Indigent Sick, treated in the following Hospitals, for the year ending December 31, 1881.

Name of Hospital.	Number of months reported	Total on hand at commencement of year	Total Admitted	Discharged Cured	Discharged	Died	Percentage of Deaths	Remaining under Treatment	Name and Residence of Physician.
State Insane Asylum	12	1107	173	74	96	91	7.1	1093	G. A. Shurtleff, M. D., Stockton, California.
Napa Asylum for the Insane	12	937	534	130	273	129	8.7		E. T. Wilkins, M. D., Napa, California.
Tehama County Hospital	12	23	92	95	100	4	3.5	11	J. M. West, M. D., Red Bluff, California.
Fresno County Hospital	12	11	109	65	12	16	13.3	16	Lewis Leach, M. D., Fresno, California.
Sierra County Hospital	12	18	37	19	13	9	16.3	13	Alemby Jump, M. D., Downieville, California.
Nevada County Hospital	12		159	50	43	14	8.8	52	R. M. Hunt, M. D., Nevada City, California.
Santa Barbara County Hospital	12	3	14	5	4	2	11.7	6	S. B. P. Knox, M. D., Santa Barbara, California.
San Bernardino County Hospital	12	37	56	21	28	7	7.5	35	T. C. Peacock, M. D., San Bernardino, California.
Sacramento County Hospital	12	124	765	559	85	76	8.4	169	Geo. A. White, M. D., Sacramento, California.
San Luis Obispo County Hospital	12	14	38	27	1	14	27.	10	R. Parkhurst, M. D., San Luis Obispo, California.
Santa Cruz County Hospital	12	21	45		39	8	12.1	28	Benjamin Knight, M. D., Santa Cruz, California.
Shasta County Hospital	12	25	62	20	31	15	17.2	21	J. M. Briceland, M. D., Shasta, California.
San Joaquin County Hospital	12	79	335		304	31	7.2	79	A. T. Hudson, M. D., Stockton, California.
Santa Clara County Hospital	12	85	229	128	70	33	10.5	83	Benjamin Cory, M. D., San José, California.
Sonoma County Hospital	12	21	178	108	166	27	13.5	33	B. S. Young, M. D., Santa Rosa, California.
El Dorado County Hospital	12	51	72		38	18	14.6		H. W. A. Worthen, M. D., Placerville, California.
Los Angeles County Hospital	12	38	243		221	34	13.9	40	Name not stated.

TABLE NO. 2.

Principal Diseases reported from Hospitals.

Name of Hospital.	Location.	Diseases of Respiratory Organs.				Fevers.				Diseases, Brain and Nervous System, including Insanity	Brights' Disease and Nephritis	Diseases of the Liver	Diarrhea and Dysentery	Other Diseases of the Stomach and Bowels	Diphtheria	Heart Disease	Aneurism	Erysipelas	Rheumatism and Gout	Alcoholism	Cancer	Venereal Diseases	Other Diseases	Accidents	Smallpox
		Consumption	Pneumonia	Bronchitis	Other Diseases of the Respiratory Organs	Typhoid and Typho-Malarial	Remittent	Intermittent	Cerebro-Spinal																
State Insane Asylum	Stockton									1280															
Napa State Asylum for the Insane	Napa									937															
El Dorado Co. Hospital	Placerville		13		4		15			10	1	2		1		1			9		1	4	20	1	
Sacram'nto Co. Hospital	Sacramento	71	11		8	12	(14	2)		60		6	5	14		13	4	9	62	35	2	116	247	71	1
Shasta Co. Hospital	Shasta	11			3			13		8				4		2	4		11		1		17	1	
San Joaq'in Co. Hospital	Stockton	17	6	6	13	6		31		45		6	4	18		1		1	42	20	3	56	84	44	
Santa Clara Co. Hospital	San Jose	31	10	10	6	6	8	5		32	4	1	3	8		6		3	31	7	2	18	53	25	
Sonoma Co. Hospital	Santa Rosa	12	6	1	3			3		26		1	1	8	1	4		2	16	7	2		26	42	5
S.L. Obispo Co. Hospital	San Luis Obispo	6	1	2						4		3		2		1			9	1		1	4	4	
S. Barbara Co. Hospital	Santa Barbara	1	1	1		1				1	1	1					1		1				3	2	
Santa Cruz Co. Hospital	Santa Cruz		1							4							2	1	3	3	4		18	6	
S. Ber'dino Co. Hospital	San Bernardino	4								3															
Tehama Co. Hospital	Red Bluff	1	3	2	1		(4	9)		6	1	1		1		1	2	1	5			3	14	12	
Fresno Co. Hospital	Fresno	4	7	7	5	11	(2	0)		7	3	1	5	1		6		5	13			7	11	7	
Sierra Co. Hospital	Downieville																								
Nevada Co. Hospital	Nevada City	3	3	5	3	5	5	9		22			1	5		1		1	17	3	2	5	28	13	
L. Angeles Co. Hospital	Los Angeles		12		46	(	4	3)		43			1	10		10		4	21	1		4	36	16	

TABLE NO. 3.

Deaths reported from Hospitals.

Name of Hospital.	Location.	Diseases of Respiratory System.				Fevers.				Diseases of the Brain and Nervous System	Bright's Disease and Nephritis.	Diseases of the Liver	Diarrhea and Dysentery	Other Diseases of the Stomach and Bowels	Diphtheria	Heart Disease	Aneurism	Rheumatism and Gout	Alcoholism	Erysiplas	Cancer	Venereal Disease	Smallpox	Other diseases	Accidents
		Consumption	Pneumonia	Bronchitis	Other Diseases of the Respiratory Organs	Typho-Malarial and Typhoid	Remittent	Intermittent	Cerebro-Spinal																
State Insane Asylum	Stockton	21	1	----	1	----	----	----	----	44	----	2	2	1	----	----	----	----	1	1	1	2	----	14	---
Napa Asylum for the Insane.	Napa	9	----	----	4	----	----	----	----	71	----	----	----	5	----	----	----	----	----	2	2	----	----	21	---
El Dorado County Hospital	Placerville	----	4	----	1	----	2	----	----	1	1	1	----	1	----	1	----	----	----	----	1	----	----	5	---
Sacramento Co. Hospital	Sacramento	28	3	----	----	4	2	----	----	7	2	1	----	4	----	7	3	----	2	1	----	2	----	7	1
Shasta County Hospital	Shasta	6	----	----	----	----	----	----	----	1	----	----	----	----	----	2	3	----	----	----	1	----	----	1	---
San Joaquin Co. Hospital	Stockton	5	3	----	----	2	----	----	----	8	----	4	----	1	----	1	----	----	----	----	2	----	----	2	---
Santa Clara County Hospital.	San José	15	1	----	----	3	----	----	----	3	1	----	1	----	----	1	----	1	----	----	2	----	----	----	---
Sonoma County Hospital	Santa Rosa	5	----	----	----	----	----	----	----	3	----	----	----	1	1	2	----	----	----	----	1	----	1	5	8
San Luis Obispo Co. Hospital.	San Luis Obispo.	1	----	1	----	----	----	----	----	----	----	3	----	1	----	1	----	1	1	----	----	----	----	----	---
Santa Barbara Co. Hospital	Santa Barbara	----	----	----	----	----	----	----	----	----	1	----	----	----	----	----	1	----	----	----	----	----	----	----	---
Santa Cruz County Hospital.	Santa Cruz	----	1	----	----	----	----	----	----	----	----	----	----	2	----	----	1	----	----	----	4	----	----	----	---
San Bernardino Co. Hospital.	San Bernardino	4	----	----	----	----	----	----	----	3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---
Tehama County Hospital	Red Bluff	----	----	----	----	----	----	----	----	----	----	1	----	----	----	1	1	----	----	----	----	----	----	----	---
Fresno County Hospital	Fresno	2	----	2	----	----	----	----	----	4	3	1	----	----	----	4	----	----	----	----	----	----	----	----	---
Sierra County Hospital	Sierra	1	2	----	----	----	----	----	----	1	1	----	----	----	----	2	----	----	1	----	----	----	----	1	---
Nevada County Hospital	Nevada City	2	----	----	1	1	----	----	----	----	----	----	----	----	----	1	----	1	1	----	----	2	----	5	---
Los Angeles Co. Hospital	Los Angeles	----	1	----	5	(	5	)	----	9	----	----	----	----	----	2	----	2	1	----	----	1	----	6	2

In the fifteen hospitals reporting, exclusive of the two asylums for the insane, there were recorded 361 patients under the respiratory class, or 161 of phthisis, 74 of pneumonia, 34 of bronchitis, and 92 of other diseases of the class, with 104 deaths—28.8 per cent. Many of the cases were doubtless brought into the hospitals in the latter stages of disease, and a considerable number, among those dying by phthisis especially, had been old inmates of the institutions. How many of those registered under "Other diseases of the respiratory organs" are subjects of phthisis can be conjectured only. In our large hospitals, having an aggregate of over 200 admissions, and nearly sixty cases of sickness belonging to this general class, not a single case is set down to phthisis, but nearly fifty to "lung disease."

Of the febrile class 380 cases are reported, 46 being classified as typhoid and typho-malarial, 291 as remittent and intermittent fevers, and 43 as simply "fevers." By the former the deaths reached 10, or 21 per cent., by the latter 4, or 1.37 per cent.

Two hundred and sixty-three cases are assigned to diseases of the brain and nervous system, with 31 deaths, or 15.2 per cent.

Twenty-two cases of disease of the liver, many of them being classed as cirrhosis, are responsible for 13 deaths, or about 59 per cent.

Heart disease occasioned 25 deaths out of 46 cases admitted, or 54.3 per cent.; erysipelas one death out of 27 cases treated, or 3.7 per cent.; alcoholism, six deaths and 77 cases, including delirium tremens, or 7.8 per cent.; smallpox, treated at contagious disease hospitals, six cases with one death, or 16.6 per cent.

The deaths resulting from accidents are few in number, eleven out of 242 cases, or 4.5 per cent. Venereal diseases aggregate 214 cases, with five deaths, or 2.3 per cent.

The above, as just observed, are exclusive of the cases treated in the asylums for the insane, into which all the patients are admitted for insanity. Most of the diseases mentioned as having been treated there were developed after admission, or were not mentioned in the commitments.

Further information regarding the hospitals reporting for the past year may be gained from the following statements forwarded by the Superintendents:

The location of the State Asylum for the Insane, at Stockton, is within the limits of said city, its grounds extending from Park street to North street, north and south, and from California street to Sacramento street, east and west, embracing one hundred and seven (107) acres of land.

There is sufficient fall for the drainage of the rain, or surface water, in the natural incline of the land, and sufficient for sewage drainage by extending pipes to the permanent water course, or into the tule marsh on the west.

The sewage at present is taken away from the building in pipes, supplied with a flow of clear water, and connected outside with extended wooden conduits; but it is desirable and in contemplation to have the sewage carried in pipes to tide water, which has been delayed in the expectation that the city would institute some general plan of sewerage with which the asylum might connect.

Ventilation in the principal buildings is good.

The supplies of food, clothing, and fuel are ample.

A corps of three physicians, denominated a Medical Superintendent, and Assistant Physicians, are required and maintained by law, for the medical care and treatment of the patients.

In the female department, the standard accommodations, as to room, are not less than an area of eighty square feet of floor or surface, to each bed or persons, exclusive of corridors, dining-rooms, water-closets, bath-rooms, lavatories, and clothes-rooms.

The two wards, called mad-houses, so long complained of as unfit for use, have been taken down and abolished, and the patients formerly kept there are now in the new addition and well accommodated.

The water supply of the institution is good, both in quality and quantity, but it all has to be raised by pumps, which is an important item of expense.

The new building was occupied on the first of April, 1882. It serves, as was designed, to raise the standard of accommodation, rather than to increase the capacity of the institution.

The institution has been occupied exclusively as a hospital and asylum for the insane since July 1, 1853—a period of twenty-nine years.

G. A. SHURTLEFF,
Medical Superintendent.

EL DORADO COUNTY HOSPITAL.

The location of the Hospital is elevated and healthy; the sewerage and ventilation are good; supplies are furnished by contract. The surface to each patient at present is not large, owing to the great number coming in during the year. The paupers are increasing at such a rate that the building will have to be enlarged. The water supply is sufficient and good.

SANTA CLARA COUNTY HOSPITAL.

The Santa Clara County Hospital is located three miles from San José and two miles from Santa Clara. The Hospital building proper is three stories in height, containing eight wards, exclusive of office, parlor, nurses' rooms, drug store, kitchen, and dining room. The two main wards where the very sick are mostly kept, on the first and second floors, are twenty-eight by ninety feet each, containing twenty beds to each ward; the ceilings are sixteen feet in the clear. The six smaller wards have the same surface space allotted to each bed, being one hundred and twenty-six feet. There are a number of outside one-story buildings for the accommodation of the convalescents and the poor, in close proximity to the main building. Our Hospital is not only a Hospital, but a poorhouse as well. The pest house is located about four hundred yards from the main building, with no occupant during the year of this report. The Hospital is furnished with artesian water elevated by a steam engine and windmills, and conveyed to the different wards through iron pipes.

The Hospital is well ventilated by plenty of windows, doors, fire places, and ventilators. The sewerage is good, being conveyed from the building through earthen pipes to a cesspool about two hundred yards distant. The supplies of all kinds are furnished by contract subject to my approval.

I visit the institution every second day, and oftener when necessary; and I think I have been something of a success during the three years I have had control. But I give to my excellent partner, Doctor Thomas Kelley, who has very much assisted, much credit for my success. And to J. B. Church, who has been Superintendent of the institution for eight years, I am vastly indebted. The farm upon which our hospital is located, contains one hundred and thirty acres, and we raise much that is used in the institution, as vegetables, grain, hay, meat, etc.

Respectfully,

BENJAMIN CORY.

SONOMA COUNTY HOSPITAL.

Condition of hospital is good. Location in center of the town on one and a half acres of land. Sewage pipes from all parts of the building discharge into cesspools fifty feet from buildings. Ventilation good, and amply sufficient. Supplies excellent, and furnished by contract. Medical attendance daily; physician appointed by Supervisors, and has full control. Surface area to each patient, about seventy square feet. Length of time occupied, twenty years. Water supply from City Water Works, which is obtained from pure mountain streams. Vegetables are raised on the grounds in sufficient quantities to supply the hospital with fresh ones. The Steward has the use of the grounds, and boards and cares for the sick for so much per diem; he also lives in the building.

The institution has capacity for fifty beds. Consumptive ward separate from ward for other diseases. We also have a County Farm, at which there are thirty-two inmates, the deaths at which are counted in this report.

B. S. YOUNG.

TEHAMA COUNTY HOSPITAL.

Location for hospital desirable; no sewerage; as to ventilation, the air has few obstructions; supplies limited; attendance, Physician and Steward; surface area to each patient, practically without limit; time occupied, the records say not; water supplied by well; general condition deplorable—in keeping with the intelligence of an average County Supervisor.

J. M. WEST, M.D.

Dr. Lewis Leach gives the following account of the Hospital in Fresno County:

The Fresno County Hospital was built upon a block of ground containing three and one half acres, and said block is four blocks from Court-house. The main building is seventy-five feet in length by twenty-five in breadth, with two wings, each twenty-four by thirty, and seventeen feet in hight, separated by a hall twelve feet in width. The rear forty-six feet of the main building is used for kitchen, dining-room, and two sleeping rooms. The anterior portion of the main building contains dispensary and one room for general use. The two wards above spoken of are said to contain (builder's estimate) 16,200 cubic feet of air, and would give eight patients per ward over 2,000 feet each. The wards are warmed by fire-places, one in each ward; ventilation from transoms and windows; sewerage good as far as tested. The building has been in use eighteen months. Supplies are the best that the market affords. Water is furnished by the Fresno Water Company, is raised by steam power from a well eighty feet in depth, and conveyed to the hospital in iron pipes. The entire management of the hospital is with the County Physician, who has discretionary power to purchase whatever he may deem necessary for the benefit of his patients. He also furnishes his own medicines, and at the end of each month makes out his bill for medicines furnished and services rendered, which, with all other bills, are placed before the Board of Supervisors, and have always been allowed.

SIERRA COUNTY HOSPITAL.

The hospital is located on the bank of the north fork of the North Yuba river, and occupies two acres of level ground, through which there is a public road. The location is about thirty feet above high-water mark, and has good drainage. The house was built in 1880, and was first occupied in December of that year. It will accommodate twenty-four patients without being crowded. Sewage goes direct into the river. The water supply is from a large creek, where there is no hydraulic mining, and is conducted through a wooden flume the distance of one half mile. Surface area to each patient 101 feet. The physician is required to visit the house at least once each day. If he is unable to attend he must have some competent physician to attend in his place. Supplies are purchased on bids, to be furnished as required for use. The physician is Superintendent, and all supplies are under his supervision. The employés are hired by the physician and are completely under his control.

ALEMBY JUMP, M. D.

Since the last report of the State Board of Health, an improvement has been made in a number of the hospitals, and one or more new and well-arranged buildings erected. I regret that no report has been received of them. The plans, presented in the last report of the Board, have been found to supply a much needed want.

The statistics of the Asylums for the Insane are interesting, insomuch especially as they are indicative of the increase of insanity in the State. In the report of the State Board of Health, for the year ending December 31, 1878, it was shown that there were in the two institutions, devoted to the purpose an aggregate, at its close, of 1888 patients; December 31, 1880, 1955 inmates; and at the end of December 1882, 2073. From January 1, 1881, to December 31, 1882, there were admitted to the State Asylum, at Stockton, 173 insane persons, and to the institution at Napa, 534, making a total of admissions, during the year, amounting to 707. At the latter asylum, the present year was commenced with 1070 inmates; up to June 30th, there had been 295 admissions, making the total number on that date 1172, or an increase in 3½ years, exclusive of those who were discharged or who died, during that time, of 458. Probably, nearly the same rate of increase obtains at Stockton.

It is not surprising that the asylums for the insane are crowded, over-filled, and that the expedient of "doubling up," or putting two patients in a room, has been, by compulsion, resorted to—a system recognized everywhere, and by no one more sensibly than by the distinguished gentlemen at the head of these institutions in California, as being highly detrimental to those under treatment, and subversive of good government.

Additional accommodations have been provided during the past year for each of the asylums; at Stockton, by the completion, in April last, of a large new building; at Napa, by the improvement and remodeling of the attic story, and other unoccupied space within the building, making quarters for perhaps 250 patients. Changes thus effected, though only partially supplying the wants of the latter asylum, afford great relief to the old wards, and will enable the authorities, for a short time, to provide accommodations for the stream of humanity seeking admission. The wards are well ventilated and comfortable. Such additions give but temporary relief. Permanent increase of room is urgently needed, and this should be effected, not by additions to the present building, but by the erection of a new, distinct brick structure, of moderate capacity, plain, without costly ornamentation, yet capable of accommodating classes of patients which should never be mingled with others, as for example the *chronic* insane. Such a building could be erected without great cost. In the Coombs tract there is ground enough for two or more such buildings, eligibly situated, with an abundant water supply. One such building would prove of great value now; in a short time it will become a necessity. It is demanded, not alone for convenience, but by the dictates of humanity. It is due to the State, and to that philanthropic sentiment which has at all times distinguished its treatment of its unfortunate wards. As a single example of the crowded condition of the asylum at Napa, it was stated that the authorities had, at one time, been compelled to place twenty-two patients in a place intended for only eight, and nearly all of these were demented and filthy. Nor is the above the only instance in which over-crowding has become necessary.

Small, cheap buildings are in many ways preferable to large ones. They are safer from fire; they admit of multiplication as occasion requires without great expenditure. They permit the separation of different classes of insane patients from each other more effectually than by the wards of a large building. In our asylums there are constantly a large number of patients whose mental condition is such as not to require restraint—imbeciles, idiots, and the like, and, sometimes, not a few harmless but weak-minded individuals who are committed to the asylum to avoid the trouble of being cared for at home. Probably there are more of this class in California, in proportion to all commitments, than in other States, in consequence of the system prevailing here. It is, in fact, a source of just complaint that persons are continually sent to the asylum for the insane who, by no plausible reason, can be considered proper subjects for confinement; yet, coming under the sanction of judicial order, the authorities have no power to decline to receive them. The eccentricities of age are, for convenience sake, magnified into evidences of insanity, and the meaningless vagaries of the imbecile are tortured into unerring indications of dementia. For this large class, promiscuous contact in the wards or recreation grounds of the asylum cannot be otherwise than injurious.

Again, it is physically impossible for three medical attendants to devote sufficient time to the study and investigation of 1,000 patients daily. It would require, allowing even five minutes to each patient, three hours more than the twenty-four constituting a day, for each of the three physicians to "go the rounds." Suppose that of these 1,000 patients 500 were incurable, requiring no study or examination, an equal number will still remain whose cases may afford a ray of hope. Again, allowing only five minutes for the investigation of each case, there would still be required thirteen hours of constant daily labor, without counting the time consumed in passing from one patient to another, and from ward to ward.

Without pursuing this subject further, it is proper to mention a present defect in the Napa Asylum, liable to become a serious one.

It consists in the arrangement of the water-closets and their ventilation. The design was to secure a downward ventilation from the closets through the chimney leading from the engine-room; but this has proved a failure. When the water is at all scarce, or the wind is favorable, foul odors are quite perceptible. Nor this alone, but the lives of over 1,200 individuals are constantly jeopardized by exposure to sewer gas, or to the disease germs it is the medium of conveying. Already, according to the statistical report received, dysentery has prevailed there during the year, occasioning five deaths. It is said to have seemed at one time to be likely to assume the proportions of an epidemic; due, according to the best judgment, to this cause. Is it policy to wait until typhoid fever, or sewage fever, shall decimate the wards?

JAILS AND PRISONS.

The condition of our jails, especially their sanitary condition, presents a subject of sufficient importance to receive the attention of the State Board of Health. It is bad enough for the unfortunate subjects of penal discipline to be subjected to confinement within the walls of a jail, bad enough in a sanitary point of view, under the very best circumstances, though necessary as a punishment for crime and for the protection of society; but however degraded this class of men may be, however reckless, to whatever extent they have forfeited the respect of community, and become outcasts from society, we cannot altogether ignore the fact that, as men, human beings, they have certain rights and are entitled to a certain amount of sympathy and care. The sentence of the law affects their liberties, and subjects them to a certain sort of discipline expressed or implied in the sentence itself. It goes no further. It does not exclude them from the rights which a common sentiment of humanity suggests, from the right to receive such an amount of care and attention, and such ordinary comforts as may be necessary for health, and for their physical, not to say moral well-being. To deprive them of these, which society owes to every one, rich or poor, bond or free, would be to add a punishment not contemplated by the law, nor included in the sentence of the Court.

Of these institutions the organic law requires recognition by the State Board of Health, and the rules of the Board have wisely designated them as among the subjects proper for consideration at the hands of one of its standing committees. For the purpose of obtaining accurate information as to the condition of the County Jails, the following circular was addressed to the Sheriff of each county:

Office of the State Board of Health,
Sacramento, Cal., September 29, 1881.

Mr.--------
Sheriff of-------- County, Cal.:

Dear Sir: The State Board of Health desires information upon subjects embraced in the following questions. Will you be kind enough to supply the answers, by filling in the space after each question, at your earliest convenience, and return the same to the undersigned, at Sacramento?

Very truly yours,
F. W. HATCH,
Secretary State Board of Health.

QUESTIONS.

1. What are the dimensions of the inclosure for jail purposes?
2. What are the dimensions of the jail building?
3. Of what material is the building constructed?

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the dimensions of the inclosure for jail purposes
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4. What is the number of cells; and what the dimensions—length, width, and height—of each cell?
5. How many prisoners are confined in each cell?
6. What is the average number of prisoners confined?
7. What method of ventilation adopted for the cells?
8. Of what materials are the cells constructed?
9. How is the jail heated?
10. What is the character and quantity of water supplied to the jail? If supplied from a well, what is the depth of the well, and what is the distance from the cesspools or privies, if there are any?
11. What is the character of the soil and the depth of the bedrock where the well is located?
12. What method of drainage has been provided?
13. How are excrementitious substances disposed of? Where discharged?
14. What arrangements have been made for the disposal of excrementitious matters at night?
15. To what extent, if any, has disease originated among the inmates, and what forms of disease have prevailed?
16. Number of deaths among prisoners during year ending October 1, 1881?
17. How do the prisoners mostly employ their time?

------ ------,
Sheriff of ------ County.

The above questions seemed to cover all important points, and are simple and easy of being answered.

Replies have been received from the Sheriffs of thirty-one counties, and so far as they relate to the hygiene of the institutions, may be tabulated as follows: (See Table.)

Of the thirty-one counties heard from, thirteen jails are reported as being built of brick; three of brick and stone; two of stone; five of brick and iron; one of stone, brick, and iron; three of wood, one of these being of hewed timber; one of brick and wood; one of wood and stone; and one of wood, iron, and stone.

CUBIC AIR SPACE.

Supposing all the cells to contain the full number of prisoners for which they are designed under emergencies, we find, in the thirty-one jails reported, 106 cells containing less than 200 cubic feet each, and 267 containing over 200 cubic feet to each prisoner. Those giving over 400 cubic feet, number 61; those 500 cubic feet, 45; those 100 cubic feet, or less, 3. In addition to these, there are some in which the relation between the cubic air space and the number of occupants is not stated.

The above figures apply, however, only to emergencies—to occasions when the jails are full, and when some degree of crowding becomes necessary. Probably such occasions seldom or never occur, except in San Francisco. This opinion is strengthened by the statement made that at the present time the full capacity of none of the jails is reached. In three, with 22 cells, there were, at the date of the reports, no prisoners; in seven, with 84 cells, there were only one half, or less than one half, of the lowest number commonly assigned to a cell. If, as is doubtless the case outside of the larger cities, only one prisoner is confined in each cell occupied, we find only 97 cells in 373, in seven localities, in which the cubic air space is less than 300 feet per head. In the very large majority it is over 400, ranging from that to above 1,000. If, as stated by Doctor Parkes and other authorities, not less than 400 cubic feet should be allowed for each prisoner in jails, and 40 square feet of floor space, at least some of our jails are deficient, accepting the highest estimate according to the reports.

These are in San Francisco, Yuba, Santa Barbara, Stanislaus, Santa Clara, Solano, and Placer Counties. A strenuous effort is continually being made, and rightly so, by the authorities of San Francisco, to compel obedience by the Chinese population to the cubic air ordinance, and yet, under their own supervision, we find a prison house with 54 cells containing only 200 cubic feet per head, when the full number are confined, and 16 cells, under similar circumstances, with only 167 cubic feet; or less than 300 cubic feet in 31 cells with only one inmate.

Taking the smallest cells in each locality, and estimating only one prisoner to each cell, we find only two localities in which the floor space allowed is less than 40 square feet; the case is far different, however, when two or more are confined therein; then, for the smaller cells, there would be less than 40 square feet in all the jails except Sacramento, Alameda, San Bernardino, and Shasta. But while the cubic air space in many of the cells is less than it theoretically ought to be, it is probable that the deficiency is generally compensated by ventilation. In a number of cases where the air space is deficient, the arrangement of the cells is such as to afford ample ventilation. The cells are commonly inclosed within the walls of the jail building, and open by cross-barred or wicketed doors into large and ventilated corridors; many of them are ventilated besides, through the roof, or sides, or by air-shafts, the effect of which must be to supply sufficient fresh air to prevent a greater accumulation of carbonic acid than is consistent with the laws of health. It must rarely happen, outside of San Francisco, that the cells are fully occupied, or that they are occupied by the same prisoners for many days in succession. Except in rare instances the prisoners are not confined during the daytime. Taking the whole number of prisoners now in the jails, full statistics of which have been furnished, it is ascertained that in 373 cells, large and small, there is only a fraction over one to each cell.

These inferences, deduced from the reports, seem to be confirmed by the statistics of mortality. Only three deaths are reported during the previous twelve months—two by suicide and one by alcoholism. Very little disease of any kind is reported. At the San Francisco prison, 47 cases of smallpox occurred, a few originating in the building. In Sacramento, Yuba and Solano, malarial fevers are mentioned, of mild form. In the latter, they are thought to be due to the absence of any drainage, to overflowing cesspools and the foul and "suffocating" odors arising therefrom. It is stated that, according to the County Physician, more medicine is given to the inmates of the jail than to the patients in the hospital. Yet, it is added in the report of the Sheriff, that "the Supervisors have refused to adopt any system of drainage, the consequence being that some of the prisoners are sick nearly all the time." The *post hoc* argument in this case seems to be legitimate. It is the only instance out of 31 jails in which a similar condition, with like results, has been reported. As a matter of economy, leaving out the plea of humanity, it would seem to be in the interest of the county to remedy the evil. Something similar, as we shall see hereafter, though less revolting and less pernicious in its effects, exists in Yuba, perhaps an almost unavoidable result of the filling up of the river-beds and the sewers by debris from the mines.

WATER SUPPLY.

An abundant water supply is reported from all the jails. Fourteen use the town or city water, which is said to be good; in one, San Luis Obispo, it is described as "hard;" five are supplied by mountain streams or springs; three obtain water from artesian wells; nine from wells varying from 14 feet to 200 feet deep; three are over 100 feet, one, 45 feet, and five 25 feet or under. Of the wells, only two—shallow wells—seem to be in very dangerous proximity to privies or cesspools, one being but sixteen feet, and the other thirty feet. The remainder vary from 120 to 300 feet distant. As a whole, the water supply must be considered good and abundant.

DRAINAGE.

The information on hand, upon this subject, is in answer to questions 12, 13 and 14. These answers are given in full in the following tabular statement:

TABULAR STATEMENT CONCERNING DRAINAGE OF JAILS.

Counties.	Questions.	Answers.
Sacramento	No. 12	Sewers and cesspools.
Sacramento	No. 13	Emptied into sewer, and conveyed to cesspool.
Sacramento	No. 14	Tin vessels are furnished with tight covers for iron cells. They are changed and washed every morning.
Placer	No. 12	A deep hole dug 50 feet from jail, and iron pipes running from jail to hole.
Placer	No. 13	Flushed out with water.
Placer	No. 14	None.
Yuba	No. 12	None whatever.
Yuba	No. 13	They are supposed to be buried in a vault, but, during the Winter, the vault overflows the yard from one to four inches deep, standing that way six months in the year.
Yuba	No. 14	None whatever, except to keep a bucket in each cell.
Tehama	No. 12	Drained to a cesspool in Court-yard, 175 feet from building.
Tehama	No. 13	Through sewer to cesspool.
Tehama	No. 14	Iron buckets in cells; good covers.
Alameda	No. 12	Oakland City system of sewerage.
Alameda	No. 13	Through the sewers.
Alameda	No. 14	By water-closets in every cell.
San Francisco	No. 12	Two main sewers, with branches connected with every cell.
San Francisco	No. 13	Patent water-closets in each cell connect with main sewers.
San Francisco	No. 14	Same as day.
Mendocino	No. 12	Brick sewer from jail to a creek about 300 yards from the jail.
Mendocino	No. 13	By the sewer described in last question.
Mendocino	No. 14	For cells, there are none. There is a water-closet in the jail court.
San Luis Obispo	No. 12	Sewer.
San Luis Obispo	No. 13	In San Luis Obispo Creek.
San Luis Obispo	No. 14	Cell buckets.
Santa Barbara	No. 12	Wood sewers to an old well 20 feet deep.
Santa Barbara	No. 13	Discharged in earth-closets, and then carted away and thrown into a covered hole.
Santa Barbara	No. 14	Earth-closets.
Ventura	No. 12	
Ventura	No. 13	A privy is situated in the main room, from which a sewer leads to the oceanside.
Ventura	No. 14	Buckets are given each prisoner.
Fresno	No. 12	From building to cesspool through pipes.
Fresno	No. 13	Water-closet to cesspool through pipes.
Fresno	No. 14	Pots in cells.
Plumas	No. 12	Iron sewer.
Plumas	No. 13	Through sewer, below town, 1,000 feet from jail.

TABULAR STATEMENT CONCERNING DRAINAGE OF JAILS—Continued.

COUNTIES.	Questions.	Answers.
Plumas	No. 14	Privy in each cell, that empties into 6-inch pipe, and thence into main pipe, and each privy piped out with 115 feet pressure every week when occupied.
Santa Clara	No. 12	Sewerage.
Santa Clara	No. 13	Stationary water-closet in each cell, connected with sewer.
Santa Clara	No. 14	Answered in No. 13.
Solano	No. 12	None whatever. Board of Supervisors having refused to adopt any system of drainage, in consequence of which, there are some of the prisoners sick nearly all the time.
Solano	No. 13	Into cesspools, which sometimes overflow, and at times become almost suffocating from the smell arising therefrom.
Solano	No. 14	None, except through the water-closets which each cell is provided with.
San Diego	No. 12	Pipes leading into vault outside of jail and inclosure; sides, bottom, and top of vault cemented.
San Diego	No. 13	The vault is cleaned by hand when necessary, and the substances hauled away and dumped into the bay.
San Diego	No. 14	A privy in each cell, with pipes leading into the cemented vault.
San Bernardino	No. 12	Sewers all through the jail.
San Bernardino	No. 13	Through pipes, in a place prepared for the purpose.
San Bernardino	No. 14	Buckets.
Los Angeles	No. 12	By sewerage.
Los Angeles	No. 13	By running into sewer.
Los Angeles	No. 14	Passing into sewers with buckets from cells.
Siskiyou	No. 12	None.
Siskiyou	No. 13	Outside of wall, in vacant lot.
Siskiyou	No. 14	None.
Shasta	No. 12	The situation of the premises is such that no drainage is required.
Shasta	No. 13	Each prisoner disposes of his own every morning, by means of buckets, in a place prepared for the purpose at lower end of jail yard, 100 feet from jail.
Shasta	No. 14	No occasion for night work.
San Joaquin	No. 12	Pipes from jail building to carry off rainwater. Drain in jail yard six inches square.
San Joaquin	No. 13	Taken out in morning and deposited in drain. Force of water in hose carries it to cesspool thirty feet outside jail premises.
San Joaquin	No. 14	None.
Alpine	No. 12	
Alpine	No. 13	Discharged into a sewer, with continuous stream of water running through it.
Alpine	No. 14	Prisoners usually at liberty to go to privy vault, at night, which is in the jail, except bad cases, who are provided with chamber.
Stanislaus	No. 12	Vitrified pipes, leading to a large under-ground cesspool fifty feet outside of jail walls.
Stanislaus	No. 13	As No. 12.
Stanislaus	No. 14	With large slop pails in the cells.
Mono	No. 12	None.
Mono	No. 13	In privy vaults.
Mono	No. 14	Buckets.
Tulare	No. 12	Sewerage.
Tulare	No. 13	In the sewers.
Tulare	No. 14	In buckets.
Mariposa	No. 12	None; as none is required, the jail being situated on a high point, or bluff, that requires no drainage.
Mariposa	No. 13	In privy, in jail yard, with excavation twenty feet deep.
Mariposa	No. 14	Buckets emptied into privy once or twice daily.
Contra Costa	No. 12	Sewers of six-inch clay pipe, cemented joints.
Contra Costa	No. 13	Through sewer into the bay.
Contra Costa	No. 14	Slop buckets at night, which, in the morning, are emptied through a sink into the sewer, which is then flushed.
Yolo		
Yolo	No. 12	None.
Yolo	No. 13	Buckets in cells emptied daily into water-closet in jail yard.
Yolo	No. 14	Buckets.
Lassen	No. 12	
Lassen	No. 13	Carried from jail sixty yards.
Lassen	No. 14	
Humboldt	No. 12	Natural.

TABULAR STATEMENT CONCERNING DRAINAGE OF JAILS—Continued.

COUNTIES.	Questions.	Answers.
Humboldt	No. 13	Water-closets in each jail. Through pipes, into Humboldt Bay.
Humboldt	No. 14	Same as day.
San Mateo	No. 12	Pipe running to a cesspool.
San Mateo	No. 13	Into cesspool.
San Mateo	No. 14	Slop bucket.
Amador	No. 12	Iron pipe leading from privy in jail to creek, 400 feet long, on a steep grade to the creek.
Amador	No. 13	Through pipe to creek.
Amador	No. 14	Covered chambers in cells, and emptied through pipes every morning.

The above tabular statement shows that of the thirty-one jails reported, seventeen drain and dispose of their excrementitious substances by means of special sewers, emptying into cesspools or privy vaults, one of these being provided with water-closets; three avail themselves of the city sewers; one uses the earth closet; six drain their sewage into the ocean, bay, or creeks; while four make no provision whatever. For the disposal of excrementitious substances at night, sixteen use buckets or other vessels for each cell; five have a water-closet in each cell, or in the jail yard, connected with a "drain to" a cesspool, or with the city sewers, or emptying directly into a watercourse; one adopts the earth-closet system for day and night; two have a privy in the cells; and, so far as stated in the reports, five have made no provision.

It will be seen that for the disposal of night sewage, more than half use covered buckets, which are emptied and cleaned each morning. This is probably a safer plan than having a water-closet in each cell connected with cesspools or sewers, unless, indeed, more care is taken to provide secure traps and proper ventilation, by connecting air shafts, than is often done in even the best houses of our crowded cities. A water-closet opening into a bedroom is a dangerous instrument at the best, and is no more suitable for the prisoner in jail than for the occupants of our most elegantly appointed hotels or private dwellings. Better than either, for the purpose required, is the earth-closet system. It is safe, clean, odorless, and can be emptied and cleaned each morning by the prisoner himself. How inconceivably better would this system be in Yuba and Solano Counties than that now in use there, in the former of which the sewage is emptied into "a vault which overflows the yard from one to four inches deep" for six months in the year; and in the latter, it is discharged from the cells into overflowing cesspools, "the smell arising therefrom being almost suffocating." Is it surprising that, with this condition of the cesspools, and with water-closets discharging therein, "some of the prisoners are sick nearly all the time?"

OCCUPATION OF PRISONERS.

The replies of the Sheriffs to the last question in the list are suggestive:

Sacramento County—Those serving sentence work on the streets, cook, and keep the jail clean.
Placer County—Walking, reading, playing cards.
Yuba County—Doing nothing only swapping lies and concocting plans to get out.

Tehama County—Those serving a term are worked in and about the Court House yard and jail; those awaiting trial are idle, as we have no authority to work them.

Alameda County—Those under sentence are worked about the jail and Court House grounds, cleaning, repairing, painting, etc., and spend a great deal of time reading.

San Francisco County—Sleeping, reading, telling stories, and putting up jobs to rob safes when they get out—excepting twenty-one trusties, who do the work of the jail.

Mendocino County—Playing checkers, cards, and reading.

San Luis Obispo County—Swing and walk in corridor and play cards.

Santa Barbara County—Lóafing within the jail.

Ventura County—In idleness; some read, and papers and books are found for them; those in for petty offenses are worked about the jail.

Fresno County—If for misdemeanors, at public labor on county ground.

Plumas County—Reading and cursing their luck.

Santa Clara County—Six work on pump, two inside and two outside trusties, and two cooks; the rest have nothing to do.

Solano County—Working the grounds around county buildings.

San Diego County—By working on streets and public grounds.

San Bernardino County—Reading, smoking, etc.

Los Angeles County—Working on public streets and playing cards.

Siskiyou County—Sawing wood for use in jail, cooking their food, and reading, etc.

Shasta County—By reading, smoking, writing, etc., some that are serving out a term sentence are required to work on the public roads.

San Joaquin County—No provision has been made for work and they are idle.

Alpine County—Reading and playing cards; those under sentence are employed cutting wood, grading, etc.

Stanislaus County—Those under sentence for misdemeanors worked in chain-gang; those for felony are allowed the use of the corridors, which are very large, for exercise, from eight o'clock A. M. to five o'clock P. M.

Mono County—Playing cards, also chopping wood for county purposes.

Tulare County—Those confined in cells, reading; those for petty offenses work in chain-gang.

Mariposa County—Eating, drinking, and sleeping.

Contra Costa County—Reading or walking in the corridor.

Yolo County—Felonies, no employment; misdemeanors, worked in chain-gang.

Lassen County—Question not answered.

Humboldt County—Doing nothing.

San Mateo County—Prisoners are idle, except what work is done to keep jail clean and grounds in order.

Amador County—Walking around the jail, reading, etc.

Of the thirty jails from which answers have been received to question No. 17, seven are reported as having established chain-gangs in which prisoners are employed in work upon the public streets or grounds, and seven as supplying other work, such as cooking, cleaning, sawing wood, etc.; in some instances work in the chain-gang is combined with other work, so that all classes are provided with something to do.

In thirteen the prisoners are said to spend most of their time in idleness, or in playing cards or checkers, though, in many cases, a portion of their time is passed in reading and walking. Thus, nine mention "reading" as one of the occupations provided.

Among the objects of punishment may be mentioned here, the prevention of crime, the holding up before the criminal the certainty of its infliction, and, if possible, his reformation. Mere restraint within the prison walls, with the disgrace, the loss of liberty, attendant upon it, is to many a real punishment. To others it is by no means so. The officers of the police will doubtless testify that not a few individuals, callous to shame, shiftless, lazy, indolent, vicious by disposition and habit, and without means of support, are no sooner discharged from imprisonment than they will commit some offense for the sole purpose of being returned. The wholesome food, the comfortable quarters, the easy, idle life of the jail, are more suited to their tastes than gaining an honest living by work. Hence, our jails, in the cities especially, are often occupied continuously by the same individuals serving repeated sentences for slight offenses. For these something more than restraint is needed; and how these habitues of the jails will, one by one, drop off and seek other localities whenever it becomes known that a chain-gang is to be established is a matter of common observation in police quarters. Their sensibilities are touched at once.

But, besides being an effective punishment, the chain-gang is a reforming agent. It affords occupation for body and mind. It breaks in upon the system of idleness common in our jails, and enforces industry. The physical system is improved by healthful exercise, while the mind is furnished with something whereupon it may profitably reflect. It doubtless deters many from the commission of crime, and thus affords a greater protection to society, while diminishing the number of vagrants, thieves and burglars, who find their favorite place of resort in the cities. The spectre of the chain-gang often becomes an effective quarantine. Like ordinary confinement without labor, it compels temperance, a thing to which a large majority of this class of criminals have been long unused; but, better than this, it teaches them the useful lesson, which probably few of them would willingly admit, that a man may have a good appetite and do a good day's work without the stimulus of a morning "cocktail."

Under all circumstances compulsory labor, whether in the chain-gang, or within the jail inclosure, on public works, or, as in some of the counties, in "chopping wood," would seem to be an act of humanity to the prisoner, profitable to him and economical to the State.

The habit of reading should be encouraged in all jails where the prisoners are not compelled to labor, and it would be a work of philanthropy if citizens having books to spare would furnish them for use there. It is not at all surprising if prisoners, having no work to perform, and no books to read, should generally pass their time "in putting up jobs to rob safes when they get out."

The above remarks are made rather by way of comment than of criticism. In reviewing the jails of the State, so far as their condition can be determined by the reports of the Sheriffs, it is but just to say that they appear to be generally well regulated and humanely conducted.

REGISTRATION OF DEATHS, BIRTHS AND MARRIAGES, AND OF DISEASES.

It becomes my duty again to call attention to the insufficiency of the registry law. This subject was urged in the last report of the State Board of Health, and presented to the Legislature in the form of an amended Act, one of the features of which was to provide a small compensation for those upon whom the duty of making reports was imposed. The present law provides such compensation for those of the County Recorders whose salaries are made up by *fees;* others, having salaries fixed by law, could not legally receive and retain fees for any purpose. The proposition authorizing each county to pay its Recorder for this extra duty imposed upon him was declared by the Judiciary Committee of the Senate to be illegal. This decision was rendered at so late a period of the session that no opportunity was afforded to prepare and procure the passage of another bill.

The difficulty of obtaining a reliable registration of deaths, births and marriages is not peculiar to California. The subject has perplexed other and older States, and has been made the topic of earnest discussions in sanitary conventions. The chief complaint has been that of the impossibility of generally procuring the desired returns from physicians and others whose duty it is to communicate the facts to the county officers. Could this be accomplished, there is little doubt that the work assigned to the County Recorders would be, in most cases, faithfully discharged. In only one instance has the circular addressed to them upon the subject been answered by a virtual refusal to comply.

After mature reflection, I am convinced that the division of the subject, as suggested in the last report of the State Board of Health, so as to require statistics of births to be collected by the School Census Marshal, is well adapted to the situation in California. These officers are appointed annually for every school district in the State; they are compelled to report, under oath, to the County Superintendents of Schools, and through them to the Superintendent of Public Instruction. It would be but a slight additional tax upon their time to impose upon them the extra duty of ascertaining and classifying the births within their districts. It is well known that one of the difficulties in obtaining a full registration of births arises from the fact that many of the cases are unattended by a physician, or even by a professional midwife. This is forcibly true of many of the country districts remote from towns. Such cases only the Census Marshal would be likely to reach.

By the voluntary action of the present very obliging Superintendent of Public Instruction, Mr. F. M. Campbell, an experiment was made in 1881, but for reasons explained by that gentleman, it was only partially successful. In his opinion, the plan can be made effectual, and I have the assurance of his hearty co-operation.

The registry of marriages can doubtless be correctly obtained from the County Recorder, as provided for by the present law.

There remains, therefore, if the plan proposed for the census of births be adopted, only the registry of deaths, for which some more effectual means is to be sought.

The difficulties attending all efforts to obtain vital statistics in the United States for registration have already been attended to. The bulletin of the National Board of Health for February, 1882, contains a report upon this subject by Surgeon J. S. Billings, Chairman of the Committee on Vital Statistics, of that Board, in which after an analysis of the various registration laws, and a comparison of the results obtained under them, he concludes that a majority of them have failed to produce any useful statistical results. "Of the twenty-three States," he says, "which have had registration laws, only eight have published statistics which can be said to have any scientific value, and none of them have published results as complete as those attained under the English registration Acts. It will seem, also, that the supposed, and probably in most cases the real, cause of failure of these registration Acts in this country, has been the want of sufficient compensation to the registering officers, and that the successive amendments to the registration Acts which have been made in the States which have secured the best results, have consisted essentially in increasing the pay of the registrars. One of the first things, therefore, to be considered in devising any scheme for registration of vital statistics, is the cost; and if the attempt be made, as it usually is, to reduce this cost to the minimum, it is pretty certain that the results will be reduced in the same proportion."

In Massachusetts, it is learned that the cost of recording a death will average about thirty cents. Yet Massachusetts, by reason of the diversity of its population, is favorably situated for the work of registration. Thirty cents per capita in California, supposing the deaths to number ten thousand, which is believed to be a liberal estimate, would require an expenditure of $3,000. This would be mainly borne by the large cities, unless, as in Massachusetts, the expense is shared equally by the State. San Francisco would pay, taking the mortality of 1881 as a basis, $1,246 50; Sacramento, $105 50; Oakland, $114 30; Los Angeles, $80 10; while to small towns and country districts, where the number of deaths is small, the tax would be insignificant. Antioch, for example, would pay $4 20, Merced $8 40, and Nevada City $11 70. Will it pay? This is the practical question which at once occurs.

Just as the prudent merchant from time to time adjusts his balances, takes "an account of stock," and reckons his gains and losses, so should the State make annual provisions for a proper estimation of its own condition, its social status, its gains by births and its losses by deaths, its productive resources, and the causes which tend to impair its vigor and retard its growth in population. Correct information on these subjects is worth paying for. They embrace matters of interest to every citizen. They have a real practical value.

Perhaps, until we are advanced more toward perfection in the registration of *deaths*, it will be too much to expect anything like a satisfactory registration of *diseases*. Yet, they are both important. They both stand at the very head of efficient sanitary work. Indeed, disease registration, so far as individual communities are concerned, possesses the greater importance. Its object is to give information which may be of immediate and vital interest; to sound the note of warning when danger threatens; to afford time for preparation against a common foe.

It is a fact, of daily observation, that too little attention is paid to the first cases of contagious disease occurring in a town. They are often concealed, from the notion that publicity may excite needless alarm; may divert intercourse and injure trade. Hence no steps are taken to secure isolation, and a disease which might have been confined to an individual, gradually extends and assumes the fearful proportions of an epidemic. There is a strange remissness on this subject, as to all the contagious diseases, and none more than in regard of diphtheria. Admitted by the best authorities to be a contagious disease, recognized everywhere as being one of the most fatal diseases of childhood—"a disease," says Dr. Baker, of the State Board of Health of Michigan, "which in one year (1869) caused in England over 1,000 deaths; in another year (1872), over 1,000 in New York City; for each of the two successive years (1876–77), in Massachusetts, over 2,000 deaths"—a disease which, he might have added, was the cause of 1,390 deaths in New York City in 1880, and 2,247 in 1881, and 8,629 in fifty localities reporting to the National Board of Health, and which, during the same year in our own State, brought desolation and anguish to many homes—it is one of the strange things in human action that measures of precaution should not be taken to prevent its spread upon its first appearance in a place. Efforts in this direction, especially in determining the special causes existing, might often be aided by the Board of Health.

Disease visits us by many avenues. It is not alone contagious disease, due to a specific germ, and of which the recognition at once suggests the means of prevention, that should be the subject of registration. An epidemic, even more deadly than any of these, may arise, the first cause of which may be obscure. It may have its origin in purely local conditions—in the atmosphere of dwellings polluted through imperfect sewerage, through defective plumbing, or possibly in the water with which the inhabitants are supplied. These are matters which not every one, even the most skillful in medicine, is able to detect. Their recognition often calls for special examination and investigation. Yet so subtle are they sometimes, so obscure, that the most experienced in sanitary methods may be baffled.

It is to aid in such emergencies, to give advice, to direct investigation into the causes of disease, and if possible, suggest a remedy, that has been made one of the most responsible duties of the State Board of Health. How can it discharge this duty unless informed by timely and authentic reports of the presence of disease?

Boards of Health should never be stationary. With the rapid advances in sanitary science and in our knowledge of preventive measures, they should be progressive. The experience of those engaged in the work is continually ripening, new facts are being evolved, new methods of advancing the important interests to which they are devoted, and which have been the prime objects of their organization. What was expected of the Board of Health in 1870 is far short of what is now demanded of it, if it would faithfully and efficiently discharge its duties. Then, State Boards of Health were regarded by many as an experiment. Massachusetts led the way, and California soon followed. Since then other States have enlisted in the work; everywhere an interest has been aroused, and busy minds are engaged in searching out a solution of the oftentimes difficult problem which the work of sanitation presents, and in elaborating new and more effective measures for the fulfillment of their high mission.

Among the measures to which the judgment of sanitarians have assigned the first place in importance, as already stated, is an efficient system of registration of births, deaths, and marriages. By the side of this, equal to it in practical utility, is the registration of diseases. To no subjects affecting the interests of the whole State, can the legislature more profitably devote a portion of its time.

It is needless to repeat here the arguments advanced in behalf of the first of these in previous reports of the Board. It will suffice to enumerate a few of the more prominent. It throws important light upon many interesting questions of vital statistics, such as longevity, the influence of city and country life, of trades and professions over the natural increase of population, as well as over disease and mortality. It determines the relative healthfulness of localities, and their influence upon the development of certain diseases. It intimately affects the distribution of property. It aids in the detection of crime.

Upon an equal basis of universal authority rests the other division of the subject just spoken of—the registration of diseases. Were such a law enforced we would be able to talk intelligently about the influence of our climate over the production of disease, the effect of seasons, of pursuits in life, and of localities.

Perhaps the period is not auspicious for the passage and due observance of a general law covering the whole State, on this subject. It is probable that the information sought for can, for the present, be obtained from the far greater portion of the State through the health officer, if there be one, or the clerk of the local Board of Health, whose duty it should be made to obtain from the physicians of his town reports of the diseases occurring, and to make reports thereof to the State Board of Health. This would require an

AMENDMENT OF THE ACT ESTABLISHING LOCAL BOARDS OF HEALTH,

and amendments thereto, are much needed, not only for this purpose, but to compel their formation and active maintenance by all incorporated cities and towns.

Nominally this is now the law. The second section of Act of March, 1878, defines the duty of the local Boards to "report to the Secretary of the State Board of Health, at Sacramento, at such times as the State Board of Health may require:

"*a.* The sanitary condition of their locality.

"*b.* The number of deaths, with the cause of each, as near as can be ascertained within their jurisdiction, during the preceding month.

"*c.* The presence of epidemic, or other dangerous, contagious, or infectious disease," etc.

This is the law, but of the incorporated cities and towns only a few have obeyed it to the extent of establishing a local Board, and fewer still of maintaining an active working organization. Several causes have occurred to occasion this result, among others, which have been mentioned to me, the unworthy one of local jealousies.

The law seems, moreover, to conflict with the chartered privileges of some of the cities, wherein it is made the right of the corporate authorities to appoint a Board of Health and prescribe rules for their government. Under this conflict of laws, the result has sometimes been—*no Board at all.*

It should be the duty of the local Board to adopt rules and regulations for *burials.* No burial should be permitted without authority from the Board of Health, or Health Officer, and the presentation of a certificate from the physician in attendance, if there has been one, as to the cause of death, or from the Coroner—said certificate to be recorded in the office of the Board, or of its clerk. In this way only can the facts be accurately ascertained. This, substantially, is the course pursued in San Francisco, Oakland, Sacramento, Los Angeles, and San José, the result being that the records of deaths in these cities are as perfect as such records can be.

Some months ago I addressed a communication to the correspondents of the State Board of Health, or other physicians, in several principal incorporated towns asking information as to the existence of any rule regulating burials. Answers were received from nine towns. Of these, five required no burial permits whatever, the only record of deaths and their causes being kept by undertakers, responsible to no one, or by Coroners when an inquest has been held. Not even has a physician's certificate been considered essential. So far as information has reached the State Board, San Francisco, Sacramento, Oakland, Los Angeles, Stockton, Vallejo and San José are the only cities in the State where any local ordinance on the subject has been passed or is observed. There may possibly be one or two more, but, if so, they have failed to convey the information of the fact in answer to the circular addressed to them. In one of the above enumerated cities, the law is not strictly observed. One correspondent writes: "We have two undertakers, one of whom never inters without a permit; the other rarely applies for one. * * * We have no City Attorney to prosecute those who fail to comply with the ordinance." The doctor thinks, however, that his reports cover all the deaths occurring there.

The Act creating Boards of Health should be further so amended as to require all Boards organized under it, and, if possible, all Boards of Health created under city charters, to adopt an order enforcing the obtaining of burial permits as suggested above. The certificates for the purpose should state the name, age, sex, condition, whether married or single, nativity, and the date and cause of death.

With such a system enforced in every town or city we might have the satisfaction of obtaining an authentic record of deaths for at least the greater part of the State and covering a large majority of the population—a valuable aid in determining the influence of our climate over disease, which would go far towards supplementing any deficiencies in the general registration law.

Both the law for the registration of births, deaths, and marriages, and that establishing local Boards of Health, therefore, require amendment; and it is respectfully suggested that a committee be appointed to consider these subjects and to report amended Acts to the next meeting of this Board.

Among other amendments to the registration law, I am convinced that its compulsory features should be made more stringent, that the Secretary of the State Board of Health should be specifically authorized to furnish, on application, small bound registers of deaths, instead of the loose blanks heretofore sought to be distributed through the County Recorders, to each physician, and that a reasonable amount should be paid from the county treasury to the registering officers for each report of death furnished, if indeed any method can be discovered, not conflicting with law, by which this can be provided for.

It is not out of place here to repeat the conclusion, already quoted, of Dr. J. S. Billings, that "*if the attempt be made, as it usually is, to reduce this cost to the minimum, it is pretty certain that the results attained will be reduced in the same proportion.*"

Respectfully submitted,

F. W. HATCH, M. D.
Permanent Secretary State Board of Health.

SACRAMENTO, CAL., October, 1882.

SUPPLEMENT TO THE REPORT OF THE SECRETARY.

SMALLPOX OF 1880 AND 1881.

The protection of a community from contagious disease consists in either mitigating its destructiveness where it has been introduced, or in preventing invasion. For the former purpose, the various hygienic measures, applicable to the whole class of contagious or infectious diseases, or to each one distinctively, are, under ordinary circumstances, more or less successfully invoked. Some of these, cleanliness, disinfection, the improvement of the local conditions, isolation of the sick, are, or ought to be, universally observed as applicable to them all, and capable, commonly, of averting wide-spread disaster.

But as the source of contagion or infection in the different members of the class varies, as well as the difficulty of preventing its introduction and diffusion, so must the means to be employed. In cholera, for example, the seat of infection is believed to be in the decomposing discharges from the alimentary canal of the sick; in yellow fever a certain decomposition of animal and vegetable matter, associated with a high atmospheric temperature; in smallpox, in emanations from the bodies of the sick, by contact with them or with infected articles of clothing and the like. Hence, the difficulty of limiting its development or extension when it has once established itself.

To the two former, the sanitary measures above mentioned are especially applicable, while in the latter we have, besides these, another essential and effective sanitary resource tested and confirmed by the experience of more than half a century—an inestimable measure, handed down to us by the immortal Jenner, beautiful in its simplicity, certain in its efficacy, and marvelous in its protective power. There can be little doubt—the fact has been demonstrated by the severest tests—that by vaccination, properly performed, rigidly enforced upon every individual in the land, smallpox would be effectually robbed of its terrors. There is almost as little doubt that, by the prompt and perfect isolation of the disease when introduced into a city or town, we have it in our power so to circumscribe it as to render its diffusion impossible. But in the present state of public opinion, it has generally been found impossible to carry out either of these measures, in an absolute manner—to prevent exposure to contagion before the presence of the disease is ascertained, on the one hand, and to conquer prejudice on the other.

Similar difficulties have arisen in applying the sanitary measures necessary to prevent the spread of the other diseases mentioned above. Hence, the quarantine system has been appealed to—a system of non-intercourse with infected localities. This has commonly been applied to seaports and vessels arriving by sea; and its restrictions have generally been directed against those diseases mentioned above—to which typhus, or ship fever, has sometimes been added.

Many serious objections have been urged against the quarantine system. It was originally intended to continue forty days, and its operation was attended by many hardships, or even barbarity. Now-a-days its duration depends mainly upon the duration of the incubative stage of the disease quarantined against, and its exactions are enforced in a more humane and reasonable manner. It seriously interferes with the business relations of nations and peoples, it restricts commerce, it trammels the liberty of the individual, and it is liable to great abuses. Yet, as a measure designed for the public safety, it has been acquiesced in.

Inland quarantine has been often spoken of, but seldom adopted. Like that against ships by sea, it has been pronounced burdensome upon the business interests of communities, and repugnant to the civilization of the age. It was regarded as a bold step—a quasi-usurpation of State rights—when an inland quarantine was established within a recent time against the propagation of yellow fever. Yet history tells us of the great good accomplished. "Quarantines (inland) established with such a degree of surveillance and vigor that absolute non-intercourse is the result, have effectually and without exception, protected those quarantined from attacks of yellow fever," says the report of the U. S. Commission in 1878.

I am not aware that a perfect and rigorous inland quarantine has ever been invoked against smallpox. Generally, it would be unnecessary, if not unjustifiable. As already stated, we have in isolation and vaccination a full protection against the disease, if only they could be enforced. Unfortunately they are not. The former may perhaps be compelled when a case of smallpox has entered a town, if early discovered, by an active and resolute health board, but the latter, so long as it is not compulsory, will not be universally adopted. False fears prevent it; ignorant prejudices oppose it; reckless carelessness favors its neglect. Yet no fact in medicine or in hygiene is more certain than that if vaccination were made compulsory, if every individual within the limits of a town or city were successfully subjected to its influence, smallpox could never spread there, and, if introduced, would die of inanition. It would starve to death.

During the past year or more smallpox has been unusually prevalent in the United States. It has raged with uncommon violence, following the lines of travel, and for a time seemed to defy the most earnest and vigorous efforts of the health authorities. It had for some time domiciled itself, as it seemed, in the metropolis of this State, making no rapid or alarming headway against the sanitary measures directed against it, but finding from time to time, among the unprotected, new material upon which to expend its force.

SMALLPOX IN 1880.

The circular of the State Board of Health, for October, 1880, contained the following notice of this disease: "Smallpox, which made its appearance in San Francisco, Oakland, and Stockton, some months ago, but limited to isolated cases, or to special localities, seems to have received a new impulse, and to have become at least feebly epidemic in the former of those cities. Cases have also been recently reported by the press in Oakland, and one in San José; one death occurred during the present month (November) at the pest house near Sacramento, the patient having been brought from the mountains. The disease was contracted in San Francisco. While there is no present need of very great alarm, the lessons of the past teach us the importance of being prepared for its approach, and of meeting it by the only prophylactic known to medical science."

The circular for November reported one death by smallpox at Willows, in Colusa County, and mentioned the fact of a case of varioloid at St. Helena, in Napa County, and the rumored appearance of the disease at Jackson, Amador County. A letter asking for information as to the extent of the disease in the latter place, was unanswered.

The December circular contained the record of eleven deaths by smallpox—ten in San Francisco and one near St. Helena, and reported a few cases as having occurred in Florin, a farming neighborhood about ten miles from Sacramento. All of the above cases occurring in the interior of the State, except, perhaps, some of those in Stockton, were introduced from San Francisco.

The statistical table contains a record of fifty-one deaths during 1880. From June 30th of that year to December 31st, 325 cases were reported and verified at the Health Office in San Francisco, which added to five cases in the hospital June 30th, make 330 cases. Of this number forty-three are reported to have proved fatal.

From the report of Doctor Woolsey, late Health Officer of Oakland, we obtain an account of the early progress of smallpox in that city. Dating from the commencement of the disease there, we find one death recorded in July, 1880, a Chinaman; one in August, a Chinaman; one in September, a native of the United States; and one in December, an infant under six months of age, a native of Oakland. "Its first appearance," Dr. W. says, "in Oakland was made known July 27th, upon the discovery of a death from the disease at the jute mills, where 710 Chinamen and boys were congregated under one roof. This was a confluent case. The second case occurred at the jute mills August 6th, but was concealed until the ninth. This was a case of confluent smallpox, and proved fatal.

The next four cases occurred at the jute mills August 10th. One of the afflicted Chinamen had confluent smallpox; another, who had previously had smallpox, had the discrete form of the disease; and the two remaining Chinamen, both of whom had been vaccinated in youth, had the disease in a mild form, which modification was evidently due to vaccination performed after they had been exposed to the disease. All these four cases recovered.

The seventh case appeared at the Jute Mills August 10th. This was a mild case of varioloid, apparently made so by "vaccination after exposure to the disease." The other cases, to the extent of fourteen, occurred in the city, making twenty-one cases, with a total mortality of four. In the absence of a hospital, efficient measures of restriction were taken by a rigid quarantine.

Smallpox appears to have commenced in Stockton in August, 1880. From the 20th of that month to February 21, 1881, forty-six cases are kindly reported by Dr. Hudson, with eleven deaths. The disease is said to have developed in the paper mill, in the person of a young girl engaged there. One case occurred among the Chinese. This patient had previously had smallpox, but died in this the second attack. Some cases were imported from San Francisco. A majority of the deaths were among children.

Of the cases occurring in Florin, in Sacramento County, just mentioned, Dr. C. S. Bradford, the physician in attendance, has courteously furnished the following information. The disease originated with a young man who had recently returned to his home from San Francisco. He had confluent smallpox, and died on the seventeenth day. The young man stated that he had been vaccinated when a lad, but no evidence of the fact could be discovered upon his arms. From this case, eight additional cases followed among the members of two families, occupying the same house. Of the nine persons attacked, three died. The last death occurred in January, 1881.

SMALLPOX IN 1881.

Passing to 1881, we find a total of seventy-five deaths reported in the table for that year.

Resuming the current history of the disease, we learn that 182 cases were reported and verified at the Health Office in San Francisco, from January 1 to June 30, 1881, viz: 32 in January, 22 in February, 35 in March, 62 in April, 20 in May, and 11 in June. Among these there were 49 deaths, making 92 deaths for the twelve months ending June 30, 1881, and 507 verified cases. Of the deaths, 75 were among the white population, 15 were Chinese, and 2 colored.

From July 1 to December 31, 1881, 119 cases were verified: July, 13; August, 23; September, 15; October, 18; November, 13, and December, 37. There were 21 deaths, viz: 3 in July, 8 in August, 4 in September, 3 in October, 2 in November, and 1 in December.

For the above information, I am under obligations to the efficient Secretary of the Health Office of San Francisco, Mr. Hoesch.

In Stockton, from February 1 to December 31, 1881, it is learned, through the kindness of Dr. Ruggles, that 21 cases occurred. Males, 11; females, 10. Under one year, 1; over one and under five years, 1; over five and under ten years, 8; over ten and under twenty years, 6; over twenty years, 5. Of the 21 cases, 11 were classified as variola and 10 as varioloid.

As to the origin of the disease, Dr. Ruggles reports: Unknown, 6; from junk, 3; exposure to a case in the country, 1; exposure in a house in which infected clothing had been hidden, and which had been discovered by some boys, 4 (this house was burned by order of the Health Officer); exposure to a case in the same family, 6. One case proved fatal, it being of the hemorrhagic type.

In July, the disease made its appearance in Sonoma County, there having been five cases and one death. I am under obligations to Dr. B. S. Young, the County Physician, for the following history:

SANTA ROSA, September 9, 1882.

DEAR DOCTOR: The first case occurred in the County Hospital July 9, 1881, and had been admitted three days before from Gurneville, in this county, supposed to be suffering from remittent fever. On the appearance of rash, he was moved to pest house. Left San Francisco fourteen days previous to admission; was not aware of exposure, though plenty of smallpox in the city. Recovered.

Second case occurred July 21, 1881, and was attributed to exposure in County Hospital, as he was an inmate at the time. Recovered.

Third case occurred July 26, 1881, also from County Hospital, and in the same ward with first one admitted. No other opportunity of contracting the disease. This one also recovered, and in a few months died with consumption.

Fourth case, an emigrant from the East, was also brought from Gurneville, this county, to County Hospital, August 15, 1881, well broken out; was cautious about exposure, and sent immediately to pest house; left San Francisco fourteen days before. This case appeared to be malignant from the start, and the long ride from Gurneville, twenty-five miles over a rough road, was too much for him, and he died in two or three days after arrival.

Fifth case, also an emigrant from the East, was apprehended on the street September 10, 1881; was in San Francisco twelve days previous. This was also confluent, and was sent to pest house. Recovered.

None of these cases had been vaccinated, except the two taken from the County Hospital, and that did not take, so that they were all genuine cases of smallpox. I would like to suggest here the propriety of having some central location in this State—say San Francisco or Sacramento—where we can procure undoubtedly pure matter. Nearly all the virus used here is from San Francisco; points, quills, and cones, have been almost worthless; and we have fallen back to the scab. I know that numbers of physicians would be glad that the State Board of Health would urge the Legislature to provide some such measure in case of epidemics.

The next account we have of the disease is from Hanford, in Tulare County. Two cases were reported, the first in the person of Mr. J. M. Fullar, a resident of the town. It proved fatal August 27, 1881. "On Tuesday, August 30," Doctor Muir writes, "his only son, aged six years, manifested the usual symptoms of the initial stage of smallpox. * * * It was of the discrete variety. The boy was vaccinated during his father's illness, but it did not succeed. * * * With regard to the origin of the disease, nothing positive is known. Fullar's wife visited Oakland about the eighteenth of July, and returned during the last week of the same month. She had a chill on the night of her return, followed by a mild fever. In two or three days she called my attention to four or five pimples upon her face, which resembled 'iodic acne.' I gave her no treatment. After smallpox developed in her husband, she told me that she had been vaccinated when a child, effectually, and that her husband had been vaccinated when a small boy unsuccessfully. I think it probable that Mrs. Fullar contracted varioloid while in Oakland, and that the origin of smallpox in Hanford may be attributed to that source."

On the seventh of October, smallpox appeared in Sacramento County, in a family twelve miles distant from Sacramento. It was in a family just arrived from Chicago by the Central Pacific railroad, in an emigrant car. This case proved fatal, and of four additional cases occurring in the house, one died. All who had been exposed to the disease before its character was discovered, were vaccinated, and non-intercourse established.

September 30, 1881, a man named Raabe died near Tremont, in Solano County, of a disease pronounced to be purpura haemorrhagica. He arrived from Holland, September twentieth, via Chicago. On the car a fellow-passenger from the latter city was taken sick with an eruptive disease, and was kindly nursed by Raabe until he had reached, it is said, some point in Nebraska, when he was put off the car. Raabe came on to Tremont and stopped with his son's family, and was visited by many of the neighbors, the true nature of the disease not having been suspected. He was said to have been vaccinated in youth, but of this there is no certain evidence. D. Raabe, the son, showed an eruption of varioloid about October eighteenth. He had been vaccinated when a boy. The attack was so mild as not to confine him to bed, and when the writer visited the next case to be mentioned, he found him there rendering assistance at the bedside, ignorant of the nature of the eruption on his body. Up to this time, indeed, it was not known of what disease young Raabe's father died.

October eleventh, one Stick, a friend of the Raabe family, and who nursed the old man during his sickness, was taken down with smallpox. The disease was confluent and profoundly asthenic, and proved fatal on the seventeenth. Through the diagnosis made in this case, the nature of the first case was made evident. This conclusion was confirmed, too, by the characteristic eruption then well developed upon the face of young Raabe.

About this time a child of the sister of the first deceased had varioloid. It was said to have been previously vaccinated. A few days later one of the children of Stick, and also a hired man, showed the variolous eruption, and, October twentieth, the wife of young Raabe was taken with discrete smallpox. Mrs. Raabe had occupied the same bed with her husband continuously. She and a nursing infant were vaccinated by myself on the fourteenth, six days previous to the first symptoms of the disease with her. Neither of them had had been previously vaccinated. Mrs. Raabe was also advised to keep herself and child apart from her husband. The vaccination was so far successful as to lighten the severity of the disease in the mother, and to prevent it in the child.

Later in October, exact date unknown, two cases occurred in the family of a friend who had Stick while he was sick, the disease not having been recognized. They were both mild, doubtless in consequence of vaccination, to which they were subjected two or three days after exposure.

The results of vaccination in this neighborhood were gratifying. In consequence of the mistake in the diagnosis of the first case, many families were exposed, also many children who never had been vaccinated. The funeral, too, was public and liberally attended by the farming population. In addition, a school in session a few rods from Stick's house, was attended by the children of the latter, and by other pupils who were in the habit of going over to Stick's house during recess. This intercourse was kept up for two days after Mr. Stick was taken sick. Of Stick's children, four, previously vaccinated, and two adults, revaccinated, escaped. Of the other children of the neighborhood, vaccinated about the same time, only those mentioned were attacked.

On the fifteenth of October I visited Dixon, a large town a few miles from Tremont, and in constant communication with the latter, and urged the formation of a Board of Health under section 3060, Art. V. of the Political Code. This was done, embracing the infected district, and strict sanitary precautions taken. At the same time, copies of the following circular, just then issued, urging a resort to vaccination, and suggesting rules for disinfection, were distributed. The circular was also sent to all the correspondents of the State Board of Health, and to the Press of the State:

[Circular of the State Board of Health.]

FACTS CONCERNING VACCINATION, AND SANITARY RULES TO BE OBSERVED DURING PREVALENCE OF SMALLPOX.

To the Public: At a regular meeting of the State Board of Health, held in this city January 16, 1880, the President and Secretary were directed to issue a circular, whenever, in their judgment, the presence of smallpox in the State seemed to demand it, impressing upon citizens the importance of vaccination, and urging its general adoption. Cases of smallpox had then recently occurred in the metropolis of the State, and in or near some other neighboring cities; and, although the disease had nowhere reached the measure of an epidemic, and there was no occasion for immediate alarm, it seemed the part of prudence to take early warning and prepare for its possible more general prevalence. The constant communication going on between the City of San Francisco and the interior of the State, favored at least a liability that the citizens of the latter might contract disease and convey it to their homes.

The circular issued at that time is applicable to the present. It read as follows: "It has been recognized as a part of the history of smallpox that it occurs at certain intervals, at periods not absolutely accurate or well defined, indeed, but sufficiently distinct to attract attention. It is probable that this periodicity is due to changes taking place in the population more than to any inherent law of the disease. During the prevalence of an epidemic of smallpox, almost every one, under the influence of fear or by force of municipal law, is sooner or later subjected to vaccination, and upon many of those previously vaccinated, the operation is repeated. Only the unprotected are attacked, and the epidemic dies out at length for want of fuel. A period of rest ensues, during which a certain proportion of adults who have been vaccinated in youth acquire renewed susceptibility, and others have been gradually but continuously added to the population by birth or immigration who have never had the disease nor been vaccinated. The fertility of the soil is renewed, ready for the reception and propagation of the germs whenever accidentally introduced.

"We, in California, have passed through one of these periods of rest. Numbers have been added to the population of both city and country, and inasmuch as where there is no cause for alarm the duty of vaccination is likely to be postponed, many of these are now unprotected; new material available for the disease has sprung up.

"While, therefore, the necessity of vaccination with those who have never been subjected to this safe and simple expedient is, in times of threatened danger, specially urgent, this necessity does not apply solely to them. It is a conceded fact in the history of vaccination that, in very many cases, the immunity it affords is only limited, or for a time. Perfect while it lasts—as perfect, it is believed, as a previous attack of smallpox itself—the duration of the insusceptibility varies with different individuals. Though in some instances it is unquestionably permanent through life, it is safe to say that re-vaccination should always be tried after the expiration of eight or ten years, or, otherwise, whenever during the prevalence of smallpox it is desirable to be assured of protection. By the observance of this rule, and the general adoption of primary vaccination in youth, it is equally safe to say that one of the most loathsome diseases which afflict mankind may be effectually robbed of its terrors.

"In thus urgently recommending a general resort to vaccination as a means of protection against smallpox, the State Board of health cannot too strongly deprecate the careless and unscientific manner in which it is often performed and its results determined. In very many cases such vaccinations serve only to deceive through a false sense of security.

"Attention is respectfully called to the following general rules, the value of which has been demonstrated by the experience of the medical profession:

"1. The virus used should be of known purity. Whether in the form of the dried crust, or as lymph, certain precautions are necessary for the safe and effectual performance of the operation. This it should be the duty of the family physician to attend to. Self-vaccination or vaccination performed by unprofessional friends, unqualified to distinguish the *true* sore or vesicle from that which is spurious, affords but slight protection against smallpox. It is at least uncertain. It may be genuine, or it may not. It is to this cause that so many reputed failures in the conservative influence of vaccination are to be attributed, and that the process itself has been regarded by many with suspicion and distrust.

"2. Revaccination during the prevalence of an epidemic, or after the lapse of eight or ten years from the primary operation, is considered necessary. A scar upon the arm, the result of a previous vaccination, affords no certain evidence that the protective influence is not lost. It has been observed that vaccination performed during the active period of an epidemic is apt to be more severe in its effects than under other atmospheric conditions.

"3. Virus obtained from the arms of revaccinated persons should never be employed. There is no evidence that it possesses any protective power.

"4. With care in the selection of virus, the danger of contracting disease thereby is reduced to a minimum. It is pretty certain that only *one* disease ever has been introduced by vaccination, and with ordinary care this is impossible. It is better to avoid virus taken from adults.

"5. The dangers attributable to the operation itself are too light to weigh against its positive benefits. It has been estimated that one serious accident may occur in one case in 100,000; certainly not more frequently than would be expected from any similar wound or abrasion of the skin. Properly done, with due precaution as to the health and vigor, and the age of the subject, and the source of the virus used, it may be confidently affirmed to be altogether without danger.

"6. No so-called vaccination which does not result in what is known as a characteristic sore or vesicle, pursuing regular changes or periods of development, is safely to be relied upon. Not unfrequently the sore upon the arm arising from the insertion of worthless virus is even more severe than that resulting from the genuine lymph.

"There is no other method than that universally adopted of making the insertion upon the abraded skin, or beneath the skin of some portion of the body, which can, with any degree of safety, be relied upon.

"7. It is an interesting fact in the history of contagious diseases, and one of great practical importance, that a certain more or less definite time intervenes between the reception of the contagion and its manifestation in the body of the individual affected—a period of latency, called the period of incubation—during which certain processes are going on in the system which are somehow preparatory to the development of the disease.

"In smallpox, this period may be stated, in a general way, to be twelve days for the beginning of fever, or fourteen for that of the eruption; in the vaccine disease, or cowpox, it is three or four; and such is the protective or antagonistic power of the latter, that if its virus or contagion be inserted even after exposure to smallpox, its shorter incubative period enables it to anticipate the other, and, if it do not altogether prevent it, to induce such a deviation from its regular course as to essentially modify it and deprive it of its greatest danger. Hence the importance of an early vaccination after exposure to smallpox.

"8. Bovine virus, or that taken directly from the cow, is fashionable, and, in consequence of the excellent arrangements which have been made by different parties, it can at all times be obtained fresh and pure. It is reliable, and it is to be recommended. Yet, there is strong reason to believe, and such is the opinion of the highest authorities on this subject, that *humanized* virus, obtained from the arm of a healthy child, loses none of its protective efficacy, even when propagated through generations."

During the past month, cases of smallpox have occurred in different sections of the State, having been imported by immigrants upon the cars of the Central Pacific Railroad. The great prevalence of smallpox in Chicago, and the constant communication with that city by rail, afford easy means for the conveyance of the specific poison to California. We have, in fact, illustrations of this influence in the instances alluded to—infected persons having been received into the cars at that city, thus communicating the disease to their fellow passengers; or, parties having been exposed to smallpox there, become its victims after their arrival here.

The precautions indicated in the above circular of the State Board of Health receive, therefore, new force at this time, and the Board cannot too strongly urge upon all who have not been vaccinated, or who have not been *revaccinated* since the age of fourteen or fifteen years, to seek the protection which so simple and harmless an expedient affords. It should be remembered that even the mildest case of varioloid is capable, equally with the most severe one of genuine smallpox, of communicating the worst form of the disease.

Attention is called to the following sanitary rules to be observed during the prevalence of smallpox.

PRECAUTIONS AGAINST THE SPREADING OF SMALLPOX.

1. *Perfect isolation of the sick.* In cities, or where a suitable hospital has been provided, this is best secured by removal of the sick. In country districts, the end may be attained by allowing only nurses and attendants to visit the sick room, and these to see no other persons during the continuance of their services as such, without having changed their clothes or subjecting them to thorough disinfection.

2. All persons exposed to the contagion should be *immediately revaccinated, even though the experiment may have been unsuccessfully tried only a short time previously.* Possibly, the vaccination may have been imperfect, or the virus inert.

3. After recovery from smallpox, the patient should not be permitted to go out, or to communicate with other persons, until the crusts have fallen off, and his clothing has been renewed or disinfected.

4. After death from smallpox, the beds and bedclothes, carpets, curtains, and other articles in the room, should be destroyed, or disinfected by the method to be hereafter directed.

Inasmuch as the bodies of those dead by smallpox are still infectious, they should be disinfected, and public funerals should be avoided.

5. *Cleanliness in and about the dwelling,* and ventilation of the latter, afford efficient aids towards the success of other measures to prevent the spread of this and other contagious diseases.

RULES FOR DISINFECTION.*

The distinction between Disinfectants and Deodorizers should be borne in mind. The former neutralize the germs of contagious or infectious diseases; the latter remove or destroy smells, or substitute one odor for another, and may or may not *disinfect.* The former are, therefore, to be preferred.

The disinfectants proper to be used vary with the object to be attained, or the articles to be disinfected.

DISINFECTION OF THE ARTICLES ABOUT THE PATIENT.

Disinfect the sheets, towels, handkerchiefs, blankets, and other articles used about the patient, as soon as removed, by immersing them in a vessel or tub containing half a pound of sulphate of zinc (white vitriol), or half an ounce of chloride of zinc, or four ounces of the sulphate of zinc combined with two ounces of common salt to each gallon of boiling water. Boil for half an hour. The articles should be placed in the solution before being removed from the room. The discharges from the patient should be received in a vessel containing one of the above solutions, or a solution of half a pound of sulphate of iron (copperas), in one quart of water. The bodies of the dead may be disinfected by washing them with the solution of zinc and salt of double strength, and wrapping them in a sheet saturated with the same solution, or the zinc and carbolic acid solution mentioned above. It is advised, also, to sprinkle the floor with a solution of carbolic acid (one ounce) and sulphate of zinc (six ounces) to one gallon of water. Neither the sulphate of zinc solutions, nor that of the chloride of zinc, will stain or injure ordinary articles of clothing. These may, therefore, be used for

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* The rules for disinfection are substantially those recommended by the National Board of Health.

THE DISINFECTION OF THE CLOTHING.

Clothing which will not admit of being boiled, and which is too valuable to destroy, may be sprinkled with one of the last named solutions, or the latter may be applied by means of a sponge, the articles themselves being subsequently exposed to the open air.

Other clothing, as silks, furs, woolen goods, and the like, to which the above means are not applicable, should be suspended in the room during its disinfection by the method immediately to be explained, and afterwards exposed to the open air. Furniture, pillows, mattresses, window curtains, and carpets, should at the same time be exposed to the process. It is advised that the carpets should be fumigated on the floor, and the mattresses ripped open for more thorough exposure.

DISINFECTION OF THE HOUSE OR INFECTED ROOM.

For this purpose, sulphur is used. The rule is to take roll sulphur broken into small pieces, place it on a metallic dish resting upon bricks set in a tub containing water, or upon other supports laid across the tub; pour a little alcohol upon the sulphur, and ignite it. Then immediately leave the room. Let the doors and windows be tightly closed, and kept so for half a day. Then ventilate the apartment for several hours. One pound of sulphur is advised for one thousand feet of cubic air space. The furniture and paint about the room may be subsequently washed and the walls whitened.

Other substances have been advised as disinfectants for the various purposes above alluded to, but those mentioned are cheap, effective, and within reach of all.

F. W. HATCH, M. D.
Secretary State Board of Health.

SACRAMENTO, CAL., October 24, 1881.

H. GIBBONS, SR., M. D.
President State Board of Health.

In the same month (October), a lady, with her child, returned from a visit to Chicago to her home in Colusa, and was soon taken down with smallpox and died. Her child, who had been vaccinated, and was then re-vaccinated, escaped. The strictest isolation was enforced, general vaccination resorted to, and no other cases occurred. Let these facts be placed to the credit of vaccination and well directed sanitation. In October a well defined case of smallpox was noted in Eureka, Humboldt County, imported from San Francisco. The patient was removed to an isolated locality. The result, whether fatal or otherwise, is not stated. Again, in October, two cases of varioloid occurred in Los Angeles, in the persons of emigrants from Chicago, by the Central Pacific railroad.

From the above review, it will be seen that the origin of the disease in the four counties was by importation by the Central Pacific railroad, via Chicago, the cars, in all save one case, having been emigrant cars. From these cars there is the greater danger in consequence of their construction, their usually crowded condition, the arrangement of the bunks or sleeping apartments, and the poor ventilation.

During this time, and for some time previous, smallpox had assumed alarming proportions in Chicago, and other cities of the Atlantic States having rapid communication with this State. It had reached Oregon and Washington Territory, occasioning much alarm in the latter; and there seemed to be a reasonable ground for apprehension that it would be yet further introduced into this State, and that, gaining a foothold in the interior towns, and in the mining and agricultural districts, many lives would be sacrificed. After much deliberation, and fully comprehending the difficulties of the undertaking, and the possibility of opposition, in the absence of any specific law authorizing the measure, the State Board of Health, at a special session held in October, and again November 11th, 1881, determined to recommend a thorough inspection of cars, and the establishment of a moderate and temporary quarantine of approaching cars near the State line. The idea of absolute non-intercourse was not entertained.

It was intended as a provisional, precautionary measure—a brief delay and detention of any found to be suffering with smallpox, and of others on infected cars—a detention limited, at the farthest, to the completion of twelve days intervening between the date of exposure and the termination of the period of incubation. The vaccination of all the passengers on infected cars, and thorough disinfection, were also included in the plan proposed. Perhaps the following abstract from the minutes of the Board will be appropriate in this place:

SACRAMENTO, November 11, 1881.

The State Board of Health met at the usual hour. Present—Dr. H. Gibbons, Sr., Dr. W. R. Cluness, and Dr. F. W. Hatch. * * *

The Secretary stated that he had requested the call of the present meeting to consider matters in relation to the establishment of a quarantine for the railroad cars coming into the State by the Central Pacific Railroad. At the last meeting of the Board a moderate quarantine system was advised near Sacramento, and the suggestion was approved by the Board, and referred to the City Board of Health. That body has since met and fully indorsed the necessity of early precautionary measures against the introduction of smallpox from Eastern cities. Subsequently to the special meeting of the State Board of Health, however, the question of quarantine has been agitated by the press and public, and the suggestion made that, in the absence of any statutory law providing for inland quarantine, the Governor might well assume the extraordinary power of authorizing the Board to proceed at once to carry out such measures as, in its judgment, might be necessary to afford protection. The authority for this action is well and forcibly stated in the communication on this subject received from the Governor. By request of the Governor the Secretary had a consultation with him in relation to the present state of facts regarding smallpox and the danger of its introduction, and it was agreed that a communication covering the ground should be addressed to him in an official capacity. This was done on Monday, the eighth instant, and the same day the following reply was received directing the State Board of Health to proceed immediately to carry out the measures suggested.

STATE OF CALIFORNIA, EXECUTIVE DEPARTMENT,
SACRAMENTO, Cal., November 8, 1881.

F. W. HATCH, M. D., *Secretary of State Board of Health:*

DEAR SIR: I have the honor to acknowledge receipt of your very able report, as the Executive Officer of the State Board of Health, relating to the enforcement of proper sanitary measures in the prevention of the introduction of smallpox within the limits of our State, through the medium of inland communication. The question is indeed a serious one, and demands prompt and energetic action. While no statutory law of a general character exists to aid your Board in its efforts, the universal law, recognized by the savage as well as the civilized man, whose justice is acknowledged alike by the heathen as well as the Christian—that self-preservation is the first law of nature—comes directly to our aid. It is the paramount principle of our nature, and to save our people from the affliction of a terrible loathsome disease, it is imperatively our duty to use every exertion, every precaution, to arrest the progress of such an infliction.

If a vessel, with but one afflicted person suffering from a contagious disease, can be quarantined for weeks until all possible danger to a community has passed, how much should the transfer of human beings through the medium of railway communication be guarded? The one is comparatively isolated. No one can come in contact with its human freight by virtue of the peculiar circumstances which surround it. The other comes in daily, hourly, in contact with the inhabitants of the places through which it passes and stops.

The germ of the disease is taken up by the wind and disseminated through distant regions; constant personal contact is the rule; no safeguard exists to prevent it, as the disease has not as yet been made palpable to the sight. Therefore the greater and more urgent is the necessity to use every means which science and common sense has taught us to employ in checking the introduction of this scourge in our midst.

I would suggest that two inspectors be appointed by your Hon. Board, acting under your directions, one of whom shall be stationed between Truckee and the northern line of the State, and the other between Colton and the southern line. I beg here to acknowledge the willing and ready manner in which the officials of the respective railroad companies responded to your request. You will use the State's appropriation as far as you can to carry out the views expressed in your report; that failing, such funds as are at my dispossal for extraordinary purposes, shall be devoted in the further aiding of this necessary and compulsory sanitary measure.

Yours, very respectfully,

GEO. C. PERKINS, Governor.

In pursuance of this order he had made arrangements, subject to the approval of the Board, for an Inspector, had prepared a draft of specific instructions for his guidance, so far as he felt authorized to do so without the assistance of the other members of the Board, and had received the assurance of Mr. Pratt, the gentlemanly Superintendent of the railroad at this place, of the cöoperation of the railroad authorities to the extent of their ability.

About some matters the Secretary was in doubt. Should a car with all its passengers upon which smallpox was found, be detained up to the ordinary incubation period of the disease? If so, and this was certainly the only proper plan, how shall the passengers be provided for? He desired an expression of the views of the Board upon these and other questions in relation to the subject.

The Secretary stated that he had appointed, subject to approval, Doctor E. C. Rhodes, of this city, as Inspector for the Central Pacific Railroad.

On motion, it was resolved that for the present no urgent necessity exists for the extension of quarantine on the southern route. In this connection, the Secretary read a telegram from Doctor J. P. Widney, of Los Angeles, stating that an inspection of all cars entering that city had already been instituted.

The Secretary read a draft of a letter of instructions which had been prepared for the Inspector. This was amended and adopted as follows:

"E. C. Rhodes, M. D.—Dear Sir: You are hereby appointed Medical Inspector for the State Board of Health for the district between Sacramento and the State line near Boca, and the following general rules are published for your guidance:

"You will take a convenient position at some station near the State line and inspect the emigrant cars on their arrival, at the same time making inquiries of the passengers as to the existence of any sickness on board at the time, or as to there having been any eruptive form of disease among them since leaving Chicago. In this investigation valuable information may be obtained from the conductor and other employes of the train.

"Should any case of smallpox be discovered upon any car, you will direct said car to be quarantined, or side-tracked, at a point suited to the well-being and comfort of the sick, and at the same time adapted to the convenience of the railroad company. It is desired that the work to be done should be so ordered and conducted as to subject the company to the minimum of inconvenience consistent with its energetic and efficient discharge in the interest of public health.

"The other passengers on infected cars should be transferred to another car, but not mixed with passengers on uninfected cars. You will examine them carefully to ascertain whether there are any unvaccinated persons among them. All such should be immediately vaccinated, making at least two points of insertion. You will also vaccinate all upon the infected car, and detain them for a period of twelve days from the date of their exposure to the disease.

"You will also inspect the express trains coming West, and satisfy yourself that no cases of smallpox were on board. In this examination the conductor and other employes of the cars will be of essential service to you. Should you be satisfied of the presence of smallpox, you will adopt the means just recommended for emigrant cars.

"If, upon inquiry, you find that any passenger upon a car has been sick with smallpox during the trip from Chicago, and has died or been removed from the car, you will consider such car to be *infected*, and proceed therewith in the manner directed for cars upon which smallpox has actually been discovered.

"When any car containing smallpox has been quarantined, you will aid the railroad authorities in seeing that the passengers thereon are well and comfortably cared for, and that the car, after the recovery or removal of the sick, is thoroughly disinfected according to the rules laid down in the general instructions for disinfection issued by the State Board of Health.

"You will be expected to keep a record of cars quarantined, cases of smallpox discovered, and vaccinations and revaccinations performed, and of every other proceeding under the duties assigned you, and to report the same in writing to the Secretary of the State Board of Health at least every third day.

"The duties to which you are assigned are important yet delicate, and the State Board of Health trusts to your discretion and good judgment so that they be exercised with prudence, and with an endeavor to disarm opposition by a courteous and dignified appeal to reason, and the demonstration of the necessity of the measures adopted rather than by the exhibition of arbitrary authority.

"By order of the State Board of Health.

"F. W. HATCH, M. D.
"Secretary State Board of Health.

"Sacramento, California, November 11, 1881."

After a general discussion of the subject, and of the means at the disposal of the Board for carrying out an effective quarantine, and certain verbal instructions for the Inspector agreed upon, the Board adjourned subject to the call of the President.

Having been supplied with a quantity of bovine virus, and other articles required for disinfecting purposes, Dr. Rhodes entered upon the discharge of his duties November 12th, stationing himself at Truckee, but traveling daily between Boca and that point for the purpose of inspecting the passengers coming west.

The first cases of smallpox were discovered in two passengers—Frenchmen—on an emigrant train, on the 9th of January, 1882.

This train, consisting of two emigrant cars and a caboose car, containing the railroad hands, was side-tracked at Tunnel No. 15, about sixteen miles east of Truckee. It was desired to detain them about three fourths of a mile from Truckee, but the excited citizens opposed it. All the passengers were vaccinated, and the sick isolated as far as possible from the other passengers. Provisions were procured at Truckee, and every effort was made to secure the comfort of the unfortunate immigrants. Credit is due to the passengers themselves for their submission to restraint. Although a slight opposition was at first manifested, in consequence of the disorderly conduct of one of the train hands, the propriety of the measure was soon conceded, and the inconvenience of detention borne with contentment and even cheerfulness.

Upon inquiry, it was learned that one of the sick men was put on board the cars at Omaha, January 2d, already sick with the initiatory fever of the disease, the eruption having shown itself on the second day after leaving that station. The disease appeared about the same time upon his brother, but so mildly as to attract but little attention.

Seven days after the first exposure of the passengers to contagion, *i. e.* on the 10th, upon visiting the quarantine ground, and ascertaining the facts, the officer in charge was requested to detain the passengers until the expiration of the twelfth day. Four individuals, who were said by the Inspector to have previously had smallpox, were disinfected and allowed to depart on the 11th of the month. By the evening of the twelfth day of exposure, a third car having been provided, the passengers after disinfection, were removed thereto; their baggage, clothes, together with the infected cars, being subjected to thorough fumigation. The two patients were removed to and made comfortable in a box car, where they were detained until it was considered safe to discharge them. On their discharge, they were provided with new and uninfected clothing.

For the purpose of securing yet further protection, on January 14th, I addressed the following communication to General Superintendent A. N. Towne, of the Central Pacific Railroad:

SACRAMENTO, January 14, 1882.

A. N. Towne, General Superintendent C. P. R. R.:

DEAR SIR: The prevalence of smallpox in many of the Eastern cities, and the easy and rapid communication between them and California, by means of the routes of railroad under your supervision, make it extremely desirable that unusual precautions should be adopted to prevent its gaining a foothold among the counties of the State. It is assumed that the railroad companies have, at least an equal interest, both as individuals and in their corporate capacity, with citizens generally in securing immunity from this scourge. The inconvenience resulting therefrom, and the restless, uneasy state of the public mind, consequent upon the presence of this disease, has been but feebly reflected in the cases recently discovered in the cars of the Central Pacific Railroad at Truckee. The instance cited, too, shows forcibly the necessity of constant watchfulness if the introduction of the disease is to be prevented.

One of the cases entered, or as stated by passengers, was *put upon* the cars at Omaha, sick and almost helpless with a fever—even at that time capable of communicating contagion. The eruption must have been pretty well developed upon his arrival at Ogden, and ought to have been detected there by careful observation. Had this been done, his isolation could have been accomplished, and his fellow passengers much more certainly protected by vaccination than was possible on the arrival of the train at Truckee. Too great a time had then elapsed since the first exposure to the disease to secure for the unprotected the full benefit of so simple an expedient. If the disease had been detected at Ogden, the care of the sick could have been submitted to those who brought them there, while much greater confidence would at that time been felt in the success of efforts to secure immunity for the passengers and the personnel of the road. The latter, from their necessary intercourse with the passengers, are especially exposed to the sources of infection—as in the handling of tickets, bank-notes and baggage. This is true of all trains, but especially so of immigrant cars, which in their usually crowded condition, and in their internal arrangement, present a most perfect contrivance for the concentration and communication of disease germs.

The State Board of Health are laboring, though under many disadvantages, to prevent the introduction of smallpox from any source, and, with this view, respectfully ask you to consider the following propositions:

First—That the train hands on roads under your supervision, connecting with trains from eastern cities, be required to be vaccinated or revaccinated, as the case may be; and,

Second—That directions be given to the conductors of such trains to satisfy themselves, as they may be able, before leaving the eastern termini of the roads, that no cases of smallpox are admitted to the cars, and in all cases of doubt, to consult the medical officer of the company stationed there. It is possible that the company of which you are Superintendent may have already taken some measures to protect its own interests as well as those of the traveling public, in this connection. If so, theyare unknown to the State Board of Health, and in the discharge of my duty, I make the above suggestions, as likely, if rigidly enforced, to effect good results. By cöoperation between the Railroad Company and the health authorities, we may hope to escape serious evil.

Very truly yours,

F. W. HATCH,
Secretary State Board of Health.

To the above communication the following reply was received:

CENTRAL PACIFIC RAILROAD COMPANY,
GENERAL SUPERINTENDENT'S OFFICE, SAN FRANCISCO, January 17, 1882.

Dr. F. W. Hatch, Secretary State Board of Health, Sacramento, California:

DEAR SIR: Acknowledging receipt of yours of the fourteenth instant, just at hand, I would say that we are disposed in every way to act with you in the good work in hand, and have arranged for a careful examination of all people arriving upon our trains at Ogden and at Tucson, and in case any are found ill, the Quarantine Officer at the former place is to be called, and our own physician at Tucson. Similar arrangements we expect to make at El Paso and Deming. With regard to vaccinating our train men, the order has gone forth.

Very respectfully,

A. N. TOWNE,
General Superintendent.

I have been thus particular in recounting the history of the quarantine on the Central Pacific Railroad, and the circumstances which led to it, because it was foreseen that the act would be taken exception to and its necessity depreciated. There are everywhere those who are ready to cavil at official acts, however well intended, and who seize with avidity upon the slightest circumstance which seems to lend plausibility to their criticisms.

The difficulties encountered in the undertaking have been partially explained. That it would fulfill the measure of a perfect system was not expected, and that it should have failed in the person of one out of forty-seven passengers was, perhaps, no more than might have been expected.

It has been ascertained that one of the passengers, one Reinhart, after having been discharged from quarantine, was admitted to the pest house at San Francisco, January 27th, and died February 2d. The individual was one of the four who were reported to me as having had smallpox, but who had been vaccinated and disinfected, and were released on the twelfth. Reinhart, as I have since learned, did not come through from Omaha, but entered the train at some point this side. The contagion was, therefore, received by him at a later date than by the other passengers. I am informed by the Medical Inspector that the man stated that he had smallpox some years previously, and that he himself had examined the cicatrices or pocks upon his body. His discharge, therefore, though unfortunate, was not really an error, in view of the infrequency of a second attack of the disease. Nor can the vaccination be blamed for the result, for it is known that this operation, even though most skilfully performed, with the best bovine virus, will fail, even as a primary operation, in about eight or ten cases out of a hundred. The result, as it eventuated, could not have been anticipated; nor does it detract from the merits of the quarantine. That, of forty-seven passengers, a number of whom had never been previously vaccinated, forty-six should have escaped disease, seems rather to afford gratifying evidence of its success.

That any quarantine, temporarily and somewhat hurriedly established as was this one, with limited means for its support, with many inconveniences attending its management, resting for its existence, not upon statutory law, but upon that unwritten law appealed to by his Excellency the Governor, which provides for States, as well as individuals, the right of self-defense, should be capable of so overcoming obstacles and prejudices as to be capable of arresting the approach of a disease so highly contagious and infectious as smallpox, at a time when the tide of immigration was steadily flowing from infected localities, was almost too much to anticipate. It was foreseen that some infected passengers might easily come through who had not yet passed the ordinary period of the incubation of the disease, and, therefore, undetectable. It was thought possible that some already sick, but not yet showing an eruption, might escape the vigilance of the medical officer in charge. The fact was recognized, too, that while the incubative stage of smallpox is usually twelve days, it may be exceptionally extended considerably beyond this, and while we were not justified in detaining passengers in quarantine for a longer period than that which usually limits its duration, we were compelled to assume the risk involved in this uncertain feature of the disease. Yet it was hoped that sufficient good might be done to compensate for the expense and inconvenience attending the experiment. It was worth the effort. A partial success was better than indiscriminate exposure, and the propriety of the measure, it may be confidently asserted, has been sustained by an enlightened public sentiment. Yet, it should be repeated that quarantines of this kind and for this purpose should be resorted to only under urgent circumstances. It cannot be too often reiterated that, if vaccination were generally adopted, if it were made compulsory, the danger of an epidemic of smallpox would be reduced almost to an infinitesimal quantity. I do not mean vaccination as often performed by parents upon their children, or by ignorant itinerants who proffer their services for a fee, but never take the care to ascertain whether the sore produced is genuine, and who would, perhaps, be unable to distinguish the true from the spurious; but vaccination in its perfectness, done with active, reliable lymph, properly inserted, and carefully inspected by a competent judge at the right time. It is the neglect of proper care in the simple matter of vaccination that has shaken the faith of so many in its efficacy.

The idea of a general system of compulsory vaccination would probably excite opposition among those unwilling to be convinced of its efficacy. But the State has a duty to perform in this connection which should not be unheeded, and we, the chosen advisors of the State in matters pertaining to public health, should not hesitate to point out the true policy, and seek to educate the public as to the vast benefits to be derived from so safe and simple an operation.

We may, however, secure this result, more slowly indeed, yet with equal ultimate certainty through our common schools.

The State is the legitimate guardian of its youth. It is upon each succeeding generation that the future prosperity of the State must depend. It has provided a munificent system of education for all who are willing to avail themselves of its advantages. As it would undoubtedly have the right to exclude from the schools any one having smallpox or other contagious or infectious disease, so it surely has the right to place its interdiction on those who, by neglect, might render themselves in any way liable to become the carriers of this loathsome disease.

Let it be established, then, that no unvaccinated child shall be permitted to enter the school, and let the Trustees of schools everywhere, in every school district in the State, be required to enforce this law—the penalty being the forfeiture of the State support. Happily, in some of the cities a stringent rule has been adopted. But it should be universal. It should apply to the country not less than the cities, for all are liable to exposure. Indeed, the history of smallpox in this State during the past two years has shown that it has prevailed in the country, in respect of localities, quite as generally as in the cities. A law similar to that suggested is to be found on the statutes of New York, and perhaps other States; and though it appears to have been very loosely obeyed, on the principle of fancied security in the absence of any pressing menace, the State Board of New York have recently called attention to it, and demanded its enforcement.

I respectfully suggest that the consideration of his Excellency, the Governor, and of the Legislature, be earnestly invited to this subject. A law like that alluded to, but modified, if required, to suit the situation in this State, rigidly enforced, would afford us, in a comparatively few years, a population so nearly exempt from liability to smallpox as to render a sweeping and disastrous epidemic of that disease quite impossible.

Such is my faith in vaccination, and such is the legitimate conclusion warranted by the whole history of the measure from its first introduction by Jenner to the present day.

In the State of Illinois, the State Board of Health, having authority, issued an order, December, 1881, requiring the vaccination of all school children. A recent report of that Board contains the following in demonstration of the wisdom and utility of this order:

> *First*—That among the thousands of cases of smallpox which have occurred in the State since the order was issued, not one is reported of a public scholar who had been properly or recently vaccinated. Several cases, however, with a large proportion of deaths, have occurred among scholars who had either not been vaccinated at all or not since infancy.
>
> *Second*—That in no instance where the order was thoroughly enforced has it been necessary to close the public schools, even when smallpox existed in a community. On the other hand, schools have been broken up and studies interrupted in a number of instances where—as shown by the returns in this office—the order had been neglected.
>
> An examination of the reports thus far received shows that more than two thirds of the total school population of Illinois, were unprotected against smallpox on the first of December, 1881.
>
> Of the two million vaccinations within the past eighteen months, over thirteen hundred thousand have been performed since the first of January, 1882, as the result mainly of this vaccination order, and of similar measures instituted by the State and local Boards of Health. Until these measures were fairly under way there was a steady increase of the smallpox—but coincidently with their successful operation came the decline of the disease, until now it is practically at an end in Illinois.

Some of the difficulties under which the State Board of Health has labored, in its contest with contagious disease, during the past year, have been recounted in the imperfect review just now given. They have consisted mainly:

First—Of the absence of any statutory law for an inland quarantine or inspection, and,

Second—Of the want of funds specially applicable for the purpose.

These subjects are important, and deserve careful consideration, inasmuch as they may concern the future action of this Board. Perhaps the occasion to adopt even the limited measures of restriction thought proper last Winter, may not soon occur again; yet it is liable to recur at any time, if not against smallpox, against cholera or yellow fever; and I deem it the duty of the State to adopt, and our duty as a Board to urge the passage of a law making provision for this possible contingency.

In the emergency which arose last year, the Board were literally without means. The appropriation of the last legislative session was intended to cover only its ordinary and necessary expenses; and they were compelled to devote to this extraordinary and unforeseen purpose a part of that fund which might profitably have been applied to other important and much needed objects. A very small sum might very profitably be appropriated by the Legislature to the prevention of the introduction into the State of contagious and infectious diseases, to be expended by the State Board of Health for this purpose only.

The Legislature should also legitimize the establishment, under circumstances deemed urgent, of inland inspection of the routes of travel, and a quarantine of infected passengers and means of conveyance. I am sure that none more than the members of this Board would deprecate the necessity of any such interference with or interruption of communication to the State. But that which has happened in the past may happen again, possibly under circumstances much more urgent and imperative than any yet encountered. It is the part of wisdom to be prepared for it.

The measures usually adopted for the prevention of contagious diseases may be embraced under two heads, viz: first, *disinfection*, and second, *isolation*. With the latter properly belongs *quarantine*. The aim of disinfection is twofold: first, to destroy the disease germ; secondly, to modify it, or render it inert. In the case of smallpox alone among the contagious diseases, we have another effective agent in vaccination. Of this, enough has been said in the preceding pages.

Quarantine has for its object on a large scale what isolation is designed to secure for individuals. Indeed, quarantine seeks to effect nothing more than the isolation of the sick. It isolates, to an extent necessary for the accomplishment of its purpose, the town or city from the outer world, just as a single house is isolated by the yellow flag or other police regulations. The recent action of the State Board of Health was somewhat different from this. It was intended to effect far inland intercommunication what quarantine does for our seaports—to exclude from a yet healthy district the infected from other districts in which contagious disease is known to prevail. It was not, as has been already said, designed to prohibit all intercourse, but simply to restrict communication with the sick and those infected by them—to exclude, or shut out, the infected from the State. Something of the same kind was organized during the past year in the State of New York. The City of Buffalo, (immigrants on the trains, going to that city, having been discovered suffering from small-pox, and conveying the disease westward) instituted, under advice of the State Board of Health, an inspection of all immigrant trains approaching the city until such time as vaccination should be required by law on all ships coming to United States ports. It was ascertained, too, that the number of immigrants landing in the United States at Port Huron was excelled only by those arriving by New York City, and Dr. Harris, the Secretary of the State Board of Health, observes that the "National Board has already engaged to maintain the cost of a competent Inspector of immigrant trains that cross into Michigan at Port Huron, and the two proposed stations in the State of New York (Buffalo and Elmira) will, it is believed, become the most important that can be established, excepting one that ought to be established at or beyond Harrisburg, Pa." In these and other measures taken about the same time, the State Board of Health acted under authority given by law. Such authority should be given in this State. It is for the purpose, in part, of protecting the State against the invasion of infectious disease that the organization of State Boards of Health are being effected in so many States. Let the Board not be left powerless to act, without weapons of defense, helpless in the hour of danger, unsupported in the presence of the foe.

RAILROAD INSPECTION.

Reference has already been made to this subject in a preceding portion of this report. It is sufficiently important to justify separate consideration.

A constant danger menaces the State through the influx of immigrants from foreign countries, bringing with them the germs of contagious and infectious diseases. Almost equally hazardous is the general and rapid communication going on between States. Through the former source, mainly, but to some extent through both, proceeded the widespread epidemic of smallpox with which many of States were afflicted during the past year, and to which some space has been elsewhere devoted.

The subject has assumed a serious aspect, commanding the earnest attention of the sanitary authorities of the States more immediately interested, and of the National Board of Health. The rapid transportation of passengers from the various ports of entry, as of New York or Baltimore, to all parts of the country, greatly increases the danger as compared with times when railroads had not so completely intersected the States, and makes it easy for an immigrant arriving at one of the above ports in apparently good health, to become the carrier of contagion, and to be seized with smallpox, for example, upon his arrival at his place of destination, three, five, or even twelve days thereafter; thus have the seeds of this loathsome disease been recently sown in many parts of the country, and the danger must constantly remain, the same result must forever be recurring, unless effective measures be taken to arrest it. So, too, was the infectious principle of yellow fever disseminated through interstate communication a few years ago, until opposed by a most rigorous system of inspection and quarantine under the energetic action of the National Board of Health.

We in California, so far as regards smallpox at least, though so remote, in point of distance, from the principal seaports and the great centers of population on the Atlantic coast, are exposed only a little less in degree than are the States east of the Rocky Mountains. By this rapid transit on railroad lines, we are brought near to them in point of time, so near that an infected passenger, upon whom the disease had not yet manifested itself by signs or symptoms, may innocently communicate the contagion on his arrival, or, if traveling by the slower trains taken by the vast majority of immigrants, on the cars after, or even before reaching the California State line. Our risk is greater now than at any former period in the history of the State. Two through lines of railroad already connect us with the Atlantic States, exposing us to the contagion of smallpox, not alone by direct immigrations through seaport cities, but by the stream of travel along many intersecting lines from States in the Mississippi Valley and elsewhere, and we are about to reach the full measure of danger in the completion of a new and cheap avenue for immigration from foreign ports, through Texas or New Orleans, under the auspices of the Southern Pacific Railroad. The completion of this road to the gulf, while not sufficient to excite uneasiness in the public mind, opens an easier route for the approach of yellow fever; already it has invaded and occasioned considerable mortality in towns in Texas, and its extension Californiaward would not meet the same obstacles which it has hitherto encountered in passing along the lines of travel from the gulf cities. Hitherto it must have come this way, if it came at all, through the northwestern States, and at so late a period as probably to be checked by frosts. A more direct road is now open to it, yet yellow fever travels slowly and by somewhat regular advances; it is apt to give timely notice of its approach; only let us be prepared to meet it, let us have the power to act effectively on the defensive should the necessity arise.

Returning to the case of small-pox, it must be admitted that, however strict and diligent may be the inspection at the quarantine ports, many immigrants must inevitably pass through who, though infected, are not yet sick. Such has been demonstrated to be the fact in the past.

Hence, in April 1882, the State Board of Health of Illinois—an organization invested with far greater power than our own State Board and many others—determined to exercise a supervision over the trunk lines leading into Chicago, for the inspection of all immigrants in transit westward, and, where necessary, their vaccination.

This action was taken with the coöperation and aid of the National Board of Health, and the State Health Boards of New York, West Virginia, Kentucky, Indiana, and Michigan, and the health authorities of Pittsburg, Cincinnati and Detroit. It was stated that the object was not to exercise the quarantine power vested by law in the Board, except as a last resource.

In the Bulletin of the National Board of Health, June 10, 1882, it was stated that the sanitary inspection of immigrants had been undertaken "at the request of the State Board of Health, and in coöperation with the State and local health authorities." The circular, so far as related to interior inspection, says: "In coöperation with railroad companies there have been stationed at suitable places on the great trunk railroads, inspectors, whose duty it is to inspect the emigrants on the trains. Cases of small-pox found in transit are immediately isolated, and, at the earliest possible moment, removed to a contagious-disease hospital, where they are properly cared for and their baggage disinfected. All unprotected are vaccinated. These duties are for the most part performed on the trains, and in such a manner as to interrupt to the least extent possible, the movement of the emigrants to their destination." The stations, at which inspections were made, and for which medical inspectors were appointed, were located in points in New York, Pennsylvania, Maryland, Michigan, West Virginia, Ohio and Illinois.

Such inspections were capable of affording protection to States west of Illinois, even to those on this side of the Rocky Mountains, under favorable circumstances, but as the period of incubation of smallpox varies, being seldom less than twelve days, and reaching, occasionally, beyond this, they cannot be relied upon by us in California. The public security demands an effort of our own; it appeals to us to take all necessary measures for our own protection.

It will be seen that the object in the cases cited has not been to establish a *quarantine*, unless such extreme measure be considered absolutely necessary, but merely to institute a thorough inspection—to isolate the sick.

Such a measure could not reasonably be supposed to interfere with the business of the roads. There could be no serious objection made to it, as indeed there could not have been to the extreme alternative of a quarantine under urgent necessity.

A law vesting in the State Board of Health of California the power to establish such a system of inspection, with authority to compel the vaccination of all unprotected immigrants, would be the means of arresting dangers to which we must otherwise be continually exposed. Even if no cases of smallpox were discovered, the power to enforce vaccination, and the consequent extension of this beneficent measure to all unprotected persons, would prove of incalculable value. It is to vaccination that we must look for ultimate protection, and each individual upon whom this simple operation is performed, detracts so much from the general liability to disease.

But if, in the maintenance of the inspections proposed, a temporary detention of cars should become necessary, there is no reason why railroads passing from State to State should not be made subject to like quarantine restrictions with vessels coming from domestic ports. In either case it is an evil, a misfortune, an inconvenience, but only such an inconvenience as may properly be demanded of the few for the public good. There should be no discrimination between railroad lines and steamship lines, but the strong arm of the law should be interposed to avert dangers from whatever source they may come.

We can do the State no greater service in this direction than by securing the passage of a law to place the system recommended into full and effective operation, whenever, in the judgment of the health authorities, it may be required. I would like strenuously to urge this subject upon the attention of his Excellency the Governor, and the Legislature. It calls for serious consideration. The appeal is in behalf of human health—the protection of our families; and the privilege is one that a wise and good Government ought to grant. Boards of Heath, to be effective, to carry out with benefit to the State the high mission intrusted to them, must be invested with reasonable power. It avails but little to recognize an evil without the power to avert it. Mere advisory powers can never enable them to fulfill the important trusts for which they are established. Advice may or not be followed. It seldom will be when it conflicts with supposed individual interests or corporate rights; yet, individual interests and corporate rights, it unfortunately happens, are not always in accord with what the public good demands. Strictly speaking, they ought to be identical. In a hygienic sense, what benefits the public benefits the individual. It is mainly when pecuniary interests are involved that a conflict occurs. By what scale can these be reckoned against life and health?

What has been said will be seen to have reference mainly to protection against smallpox. It is with regard to this that the need of a law providing for railroad inspection has been urgently needed during the past year. But, as already hinted at, other dangers may come upon us—dangers more sudden in their invasion, more rapid in their progress, and requiring the most energetic measures. When disease does come it may not be possible to obtain legislative authority for these restrictive measures, and the State Board of Health will find itself again crippled, compelled to do that by sufferance and by virtue of an act of favor which it ought to have the undoubted right to do.

The principle applies to the whole class of epidemic, contagious, or infectious diseases.

The passage of a law such as has been suggested, by no means necessitates the exercise of the authority conferred. The object is to provide against emergencies which may arise—to legalize such action as the safety of the Commonwealth may justify and demand.

APPENDIX.

The Board of Health, while generally approving the papers presented in this report, are not responsible for the particular sentiments expressed.

BOARD OF HEALTH.

THE SOUTHERN CALIFORNIA CHANNEL ISLANDS AS HEALTH RESORTS.

By J. P. Widney, M. D., Member of the State Board of Health.

As a person takes one of the coast steamers and sails south from San Francisco, he begins to notice, the afternoon of the second day, after rounding Point Concepcion, an occasional island lying to the seaward of the vessel's course. He still notices them until he reaches the port of San Pedro, opposite which lie Santa Catalina and San Clemente, the last of the number. This chain of islands forms the outer boundary of the Santa Barbara channel. The larger islands are six in number, called, in their order coming South, San Miguel, Santa Rosa, Santa Cruz, San Nicolas, Santa Catalina, and San Clemente. They seem to be the remaining peaks of a submerged range of mountains which ran parallel with the present coast line. They vary in distance from the main land, ranging, however, from twenty-five to fifty miles off shore. As to size, they vary from three to twenty-five miles in length, and from one to five in width. They are rocky masses, with a light, tolerably fertile upper soil, yielding a fair growth of the annual herbage of the California coast, and having more or less of a low scrubby dotting of chaparral, with some few trees. Running water, except in the rainy season, is not found; but there are some few springs, and well water is readily obtained at reasonable depths. The elevation above the sea varies from a few feet to low peaks of some hundreds of feet. These islands have been used for many years as sheep ranges, the sheep taking care of themselves, and the owners going over twice a year to shear them and bring back the wool. The eastward trend of the coast line, below Point Concepcion, gives to these islands, in common with the main land of Southern California, shelters from the strong, rather harsh northwest wind, which, in Summer, sweeps daily, inland, over the northern portion of the State. Yet, while having the general characteristics of the Southern California climate, they possess climatic peculiarities of their own which are well marked. Their distance from the main shore frees them from the force of the sea breeze which daily blows inland, and which, mild as it is, is still too fresh for many delicate invalids who yet crave, and are benefited by, the salt sea air—that class of invalids who, while they can, with impunity, take a sea voyage, cannot dwell by the borders of the sea. The distance from the main land also exempts them, in a great measure, from the night fogs which hug the coast. Their limited area does not suffice to produce a sea breeze or fog system of their own.

With all that has been said and written about the many climates of California, and their comparative advantages as health resorts, the climate of these islands seems to have been overlooked. And the climate is a peculiar one, unlike any other to be found upon the Pacific Coast.

I shall more particularly describe Santa Catalina, which, from its position off the Port of San Pedro, the ocean terminus of the whole southern system of railroads, is the most noted as a place of resort. The island lies about twenty-five miles from the main land; has a length of some twenty-five miles, with a width of from three to five, but narrowing midway to a neck only a few hundred yards across. This indentation upon the landward side forms what is marked upon the maps as Catalina harbor, a rather open haven, offering fair shelter, however, to a limited number of vessels. The island has rather a broken, hilly surface, rising at one or two points to a height of some hundreds of feet. Many persons go over each year from Los Angeles and camp upon the island for the Summer months. The favorite camping ground is at or near the narrow portion of the island which I have mentioned. Here, upon the ocean side of the neck, is a firm sandy beach, with the full roll of the breakers, offering the finest surf bathing, while upon the harbor side is only a gentle swell, not even breaking upon the shore, and affording unrivaled facilities for a sea bath to those who dread, or are not strong enough to encounter the surf. The comparatively sheltered waters of this bay offer, also, especially fine opportunities for boating and fishing. The water is so serene that the sandy bottom, covered with shells and sea plants, is plainly visible at a depth of fifty feet.

During the Summer months a vessel runs constantly from the port of San Pedro to Catalina Harbor, for the accomodation of passengers. There is no hotel upon the island, parties having to camp out, but in the mild, equable, rainless, Summer climate, which changes little night or day, this is rather a benefit to invalids, who here run no risk from inclemency of weather. The time is rapidly coming, however, when, as the peculiar advantages of the island as a health resort become more widely known, ample hotel accommodations must be provided.

The peculiar merit as health resorts possessed by these islands, consists more especially in this, that while lying within the line of a semi-tropical climate, and that climate one entirely exempt from the scourge of yellow fever and the ordinary southern diseases, their comparatively small size, and their distance from the mainland, free them from even the ordinary force of the daily sea breeze, and from the coast fogs, while giving to them a remarkably equable temperature by day and by night. To live upon one of them is like taking a long sea voyage in the semi-tropics, without the attendant discomfort and sickness; while at any time a person is within a few hours sail of the mainland, and the port of the southern transcontinental system of railroads.

I cannot give tables of temperatures, as no regular observations have been taken upon the islands, but the following, from the United States Signal Service at Los Angeles and San Diego, will give the grounds for forming an estimate:

MONTHLY MEANS OF TEMPERATURE.

	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March.	April.	May.	June.
Los Angeles.	71°.1	70°.1	69°.8	63°.4	62°.1	55°.3	54°.1	54°.6	55°.8	58°.0	62°.0	64°.7
San Diego..	68°.9	68°.5	67°.9	63°.6	60°.1	56°.2	55°.0	55°.5	56°.3	58°.2	61°.6	64°.2

Average maximum and minimum daily variation for July at Los Angeles, twenty-one degrees; San Diego and San Pedro, eleven degrees.

It will thus be seen that the monthly variation is less at San Diego, directly upon the coast, than at Los Angeles, which lies sixteen miles back from the sea. It will also be seen that the daily variation of temperature of twenty-one degrees for July, at Los Angeles, drops down to eleven degrees at San Diego and San Pedro, immediately upon the coast. The variations upon these comparatively small islands, out from twenty-five to fifty miles from the main land, and surrounded by the equable temperature of the ocean waters, would certainly be, to a notable degree, still less; and such is the statement of all persons who have spent much time upon them.

SANITATION IN SCHOOLS.

By C. W. Breyfogle, A. M., M. D., San José, Member of the State Board of Health.

We have good reason for boasting of the general advancement made in sanitation in the past decade; but it is surprising how little of sanitary research has been applied to the proper construction of school houses. The standard works on sanitary science either totally neglect the subject, or devote a very few pages to curt, and in the main impractical, directions. Standard works on education are found to be still more negligent, and where any mention is made of the subject it is usually in the nature of a few worn out platitudes. The result of all this is seen to-day in faulty teaching, objectionable sites and badly constructed buildings, and in physically deformed men and women, with deformed minds, because they exhibit simply a brilliant cramming, instead of healthy intelligence. There must be a sound physical, or there cannot be a sound mental. They are equally and unitedly necessary to success. Either the educators of our State must be taught sanitation, or there must be some authoritative and frequent examination of our buildings, and grounds, and teaching—an authority sufficient to demand and enforce changes in existing objectionable features, and whose approval must be obtained before the erection of new buildings. It needs but an examination of our present system to demonstrate that such authority, properly used, would save the children of our State from untold evils from which they are now suffering.

It is impossible, in the brief limits of this paper, to give more than a few general hints. My object is simply to call the attention of the public to the general want. First, a few of the errors, now existing, which have come under my personal observation: I have seen an experienced teacher, principal of a large city school, exercise her class (aged from seven to ten years) in calisthenics as soon as they had re-assembled after their noon luncheon. I have seen children compelled to go from an over-warm school room to the open, rainy atmosphere, because, forsooth, it looks well to have them march from the play-ground to their rooms, keeping step to the music of the piano. I have seen girls, at the age of puberty, marching to the same music slowly up a long flight of stairs. I have seen fifty pupils, from six to seven years of age, ranged in a row upon one side of a room, the light glistening and scintillating upon a blackboard thirty feet distant, which was covered with small figures crowded together, while the little ones turned themselves this way and that, in order to read the figures, the walls above and around being brilliant, dazzling white. I have seen the dress and eyes of little pupils full of dust from chalk crayons used upon rough blackboards, when it is full as easy, and as cheap, to have the boards smooth, so that they cause no dust. Stooping shoulders, from too low desks or seats too high, so that there is no support for the feet; spinal deformities, from errors of position in studying; affections of the brain, from too close proximity to a heated stove; catarrhal affections, from draughts or cold extremities, are a few of the faults daily coming within the cognizance of the physician. The reason for the existence of such palpable evils is found in ignorance, pure carelessness, and false economy. The remedy is in the exercise of simple common sense, treating the children at school as we would treat them at home, and the more thorough enlightenment of teachers and Boards of Education upon sanitation, health and hygiene.

The question of light, heat, ventilation, and exercise are of course of paramount importance. By my request, Dr. H. C. French, Oculist and Aurist, of San Francisco, has tested the eyes of four hundred pupils in the public schools, and the result gives such positive evidence of constant, and in many cases permanent, injury, that it is virtually a condemnation of the whole school system. The investigation will be prosecuted still farther, and the result made known at the proper time. I will give, briefly, the conclusions at which he arrives at this stage of the investigation, regretting that they must be at all condensed. The light should be admitted from such portion of the room as will allow it to be behind the pupils, and it should be sufficient to equally and abundantly illuminate the whole room. The ceilings and walls should be tinted some neutral color (never plain white), and the blackboards should be dark green instead of black. If the light be admitted from the rear of the scholars, it will necessarily be in the face of the teacher. Still, of two evils he chooses the least; but, wherever practicable, he advises that the room be lighted from the roof, thus furnishing a steady light through all the room, and from the best possible direction. This involves a one-story building, and is therefore impractical in our large cities except for the upper story. The best substitute would be a longer and narrower room, lighted from one side only, the pupils sitting with their backs to the light. In the four hundred pupils examined, there was found such a remarkable percentage of amblyopia, asthenopia, myopia, and other kindred diseases, as to lead to the undoubted conclusion that these affections were the direct result of our present school system.

Without considering the various theories of ventilation (however important they may be to a full understanding of the wants of our public schools), I would simply give a few plain requirements and practical suggestions. The ceilings of the rooms should have a minimum height of twelve feet, and a maximum of fifteen feet. Nine square feet of floor space should be allowed for every scholar; and equally important is it that two hundred and fifty cubic feet space be the minimum allowance for each. The usual allowance is not more than one hundred and ten, where it should be three hundred. One thousand cubic feet of fresh air being required for each pupil every hour, the means of procuring the fresh air and emitting the foul constitute one of the most important elements in construction. In our climate, I think the best plan would be as follows: Let each school-room be supplied with that very necessary adjunct, a small ante-room, for supplies, etc., and made either as a projection in each outside wall of the building, or at the outside corners. In this room let the wainscotting extend five or six feet high. Let the space of twelve inches above the wainscotting be open freely to the outside air, being covered simply upon the inside with porous cloth, thus admitting an abundant supply of fresh air at a sufficient height from the ground to avoid malarial exhalations, while the porous cloth, the height from the floor, and the small supply-room prevent dangerous drafts upon the scholars. For the exit of the foul air, ventilation at the top of the walls near the ceiling, is necessary for all buildings of more than one story. In one-story buildings, and in the upper story of others, it should be accomplished as follows: Let a galvanized iron pipe, thirty to thirty-six inches in diameter, pass from the center of the ceiling directly through the roof and a few feet above; the lower end to be flush with the ceiling, and furnished with a graduator for opening and closing it. Through the center of this pipe let the stovepipe ascend, rising a few feet higher, both pipes being furnished with proper caps. The larger pipe will give ample exit for the vitiated air, aided by the hot stovepipe, while the danger from fires through defective flues is entirely obviated.

In our State, the heating of the school-room is a problem less difficult to solve than in colder climates, and I need not dwell upon it.

Too little attention is given to exercise upon the play-ground. If some system were adopted in which the teacher would take a leading part, much could be done to relieve the tedium of school hours, and impart a healthy stimulus to study. The Germans are fond of athletic exercise, and it comes from systematic training in gymnastics in their schools. The English games show a nation's pluck; while, as Professor Swett aptly suggests, the recreation of Americans is *business*. For the boys, there should be on every school ground the horizontal bars, jumping board, swings, and ladders; inexpensive, and paying an immense interest upon the investment. For girls, the light dumb bells and the wands, costing but a trifle.

The sewerage, water supply, and drainage, should be more carefully regarded even than in the construction of dwellings. It would be well often if the physician, while searching in vain for the cause of diphtheria in the sewerage of the house, would look at that of the school his patient attends. It is a sad but, alas, almost universal mistake to conclude that because children are in school but a few hours, and that during the day, no attention need be given to sewerage. How long does it take exposure to infuse the poison of terrible disease?

The site of the school-house is important. Clayey soil with its chilly dampness is a frightful source of ill-health. Made ground, the original low, swampy, or an old watercourse, and perhaps the filling of garbage *et id omne genus*, is prolific of death, or at most large doctor's bills. Building a fine school-house, then grading and filling the grounds, without proper careful under-drainage, simply makes a cess-pool of the cellar, a factory for generating poison for the atmosphere above. Let the daily resort of our children be placed upon a gravelly, sandy or loamy soil, and then protect it still further by that thorough under-drainage which, though a little expensive at first, is so profitable in health and cheerfulness.

While these are the general features of this great question, there remain others very important and necessarily associated. These should be constantly before the mind of the teacher, and frequent occasions will occur when much good to the scholars, to the men and women of the future may be founded. Under this head I would mention instruction in the position of the body, the care of the person, the diet, having the clothing loose, general cleanliness, neatness and economy. Care too should be taken that the pupils be not urged too rapidly, or promoted until able to maintain themselves in the higher grade, and hence that their studies at home be guarded. Children under the average age of twelve should have no home study. Those from twelve to fourteen not more than one. Girls from fourteen to sixteen not more than one hour.

Lastly, let me urge one more essential to perfect sanitation, and one universally disregarded as far as I am informed. The model Board of Education may provide the model school-house, one story, lighted from the roof, tinted walls and black-boards, heat, ventilation and sanitary surroundings perfect, play-grounds cheerful and furnished with everything that will combine amusement and profit. When this is done they may employ a teacher who will antidote it all, while the scholars show dullness, gloom and discouragement. The modern educator and the modern physician are more and more impressed with the necessity of having a sound body *and* mind, equally adjusted, evenly balanced, if we would reach the perfection of mental attainment. Let then the last essential of perfect sanitation be the well drained (I beg pardon?) the well trained teacher, whose bright and cheerful looks and greeting, whose mild but firm discipline, whose interest in their childish sports as well as their studies, and whose contagious enthusiasm leads them to the perfection of *mental sanitation* as the grand culmination of all.

THE POLLUTION OF RIVERS.

By F. W. HATCH, A. M., M. D.

Pure water is a necessity of life. It is essential not less to the happiness than to the health of the people; and yet it is one of the things most difficult to obtain. The use of impure water is now generally recognized as a common cause of disease, and to no other single agent, or combination of agents, are to be more generally attributed those sudden outbreaks of disease by which communities are sometimes afflicted. No other fact in sanitary science is more firmly settled than that of the connection between impure water and disease.

The State was doubtless impressed with this belief when, in 1876, Section 374 of the Penal Code became a law. It reads as follows:

> Every person who puts the carcass of any dead animal, or the offal of any slaughter pen, corral, or butcher shop into any river, creek, pond, reservoir, stream, street, alley, public highway, or road in common use, or who attempts to destroy the same by fire within one fourth of a mile of any city, town, or village, and every person who puts the carcass of any animal, or any offal of any kind, in or upon the borders of any stream, pond, lake, or reservoir from which water is drawn for the supply of the inhabitants of any city, city and county, or any town in this State so that the drainage from such carcass or offal may be taken up by or in such stream, pond, lake, or reservoir, or who allows the carcass of any dead animal, or any offal of any kind, to remain in or upon the borders of any such stream, pond, lake, or reservoir within the boundaries of any lands owned or occupied by him, or who keeps any horses, mules, cattle, swine, sheep, or live stock of any kind, penned, corraled, or housed on, over, or on the borders of any such stream, pond, lake, or reservoir, so that the waters thereof shall become polluted by reason thereof, is guilty of a misdemeanor, and upon conviction thereof shall be punished as prescribed in Section 377 of this Code.

It is a matter of common observation that this law is not observed. It is violated almost daily in the City of Sacramento by Chinamen living along the border of the "slough," and by others. It is violated there by citizens resident upon the streets and alleys, but who manage to escape detection. It is notorious that the sewage from towns situated along the banks of our principal rivers—notably the Sacramento—has been emptied or permitted to flow therein at all seasons of the year; that the refuse from dwellings, and sometimes from pigpens, stables and privies, has been discharged therein, with the full knowledge on the part of property-owners and the authorities that this water forms the principal or only source of supply for nearly thirty thousand people living below them.

Nor, looking especially at the Sacramento River, are these the only sources of defilement. The Feather River adds its quota from settlements but a few miles above its junction with the Sacramento; and, as if to fill up the measure of the misfortune of those compelled to use this water, the American pours its stream of filth from settlements along its banks, and from five hundred or six hundred human beings inclosed within the walls of the State Prison at Folsom.

The disposal of the sewage of towns, or of large public institutions, is beset with difficulties, and the easiest solution of the problem—the most natural place of discharge for towns built upon the bank of a river, is the river itself. It saves much inconvenience and expense; it affords the speediest and most effectual method of getting rid of that which all desire to have removed as far from them as possible; and, too commonly, but little concern is manifested whether it is destined to become the daily supply of others, or whether those who drink it are satisfied or not.

Fortunately for Sacramento, with its twenty-three thousand population, this filth comes to us in a form so diluted as to be no longer detectable by or obnoxious to the senses, however revolting it may be to the imagination.

The plea of convenience is, in fact, the only argument by which the practice spoken of has been sought to be maintained.

But, it is said that the law quoted does not apply to the discharge of sewage into the rivers, and the writer has been informed of legal opinions to that effect. If this be true, if such opinions are tenable, let the law be amended; let it be made ample enough in its scope to reach the chief of all nuisances which such a law can possibly include; let it be made so plain that no ingenuity can wrest it from its legitimate purposes, so clear that "the wayfaring man, though a fool," may not be deceived.

Towns along the river may then find it within their power to adopt other methods for the disposal of sewage, and the State itself will be able, with the facilities at its command, to overcome the apparent difficulties which, doubtless, led to the existing arrangements at the Branch State Prison. It is understood that the attention of the authorities at the latter, has already been directed to the subject.

The question of the contamination of streams by sewage, and of the different measures proposed for the disposal of this troublesome agent, was fully discussed in the report of the State Board of Health for 1877–9. It was there shown that, according to the best authorities, while running streams do have the power, to a slight extent, to oxidize the sewage with which they have been contaminated, this oxidation takes place so slowly, and so inconsiderably, as to be almost inappreciable by chemical tests, and that, to use the emphatic language of the English Commission, composed of men especially fitted to pursue such an investigation, it is impossible to say how far such water must continue to flow before the sewage it contains becomes thoroughly oxidized. It was further shown that the apparent innocuousness of such water is mainly due to the conservative agency of dilution; that the greater the dilution, the less the danger; and that water containing even an excess of what is commonly considered to be a safe amount of sewage may often be used with impunity, until "upon the outbreak of an epidemic of typhoid fever or of cholera, its presence is made known by fearful demonstrations of fatality."

Admitting these facts, which are believed to be incontestable, the question instinctively forces itself upon the mind as to the position in which the population of Sacramento would be placed should an epidemic of one of these diseases appear at the State Prison at Folsom, only twenty-two or twenty-three miles distant, or at Marysville, sixty miles above us.

The question of the disposal of sewage involves many difficulties. The various methods proposed for the purpose were considered in the report above referred to, and the objections to each, as compared with the discharge into the sea or other large bodies of water, not used for drinking purposes, or below the point where it may be hurtful, pointed out. But, as the latter is often impracticable, it is often necessary to resort to other methods, the important problem being, how to reconcile effectiveness in the result with economy in expenditure.

The objections there urged were to the adoption of some of these methods for towns; they apply less forcibly to isolated dwellings or institutions.

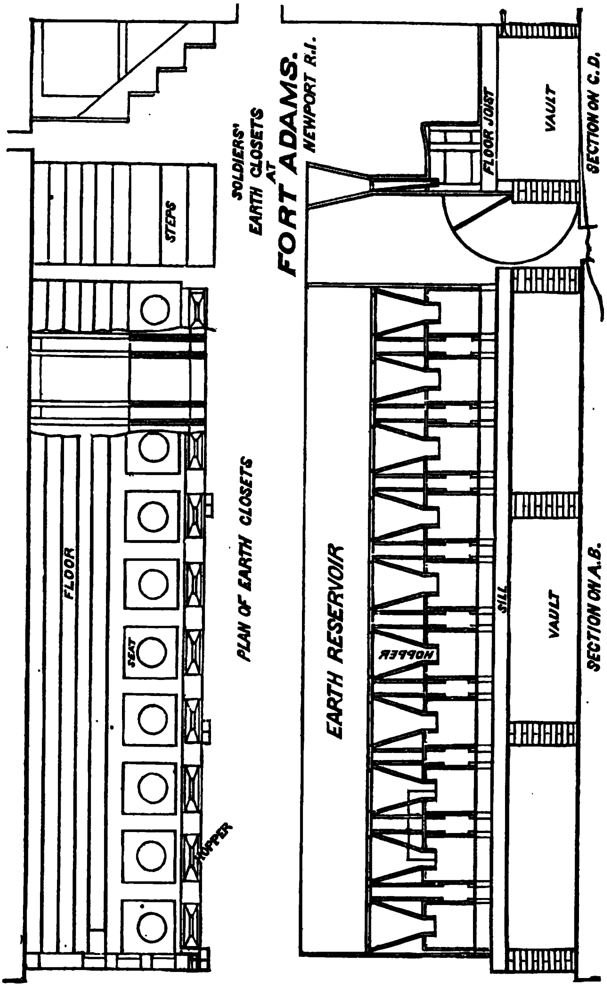
It is not designed to review these various plans at this time; they must necessarily vary with the amount and character of the sewage to be disposed of, the water supply, the topography of the place, the geological character of the soil, the rainfall, and other circumstances. Viewing the subject as applicable solely to the Branch State Prison at Folsom, it would seem that the conditions are eminently favorable to the success of the dry earth system as proposed by Moule, or as designated by Mr. Waring, Civil Engineer, the "Dry Conservatory System." These conditions are, substantially, a simple closet for each cell, an abundant supply of earth of the right kind, or of ashes, and regular and systematic inspection and removal; or, instead of having a receptacle in each cell, a series of closets might be constructed, as is already done at the prison, under the water-carriage system, like those, for example, in use at the garrison, at Newport, Rhode Island (Fort Adams), and which are shown in the accompanying plan, taken from the excellent work of Mr. Waring. The deposits are received on the concreted floor of the casemate in which the closets are placed. Such closets, arranged with divisions between the seats, Mr. Waring says, are well adapted for the use of schools, asylums, etc.

The vicinity of the prison is capable of affording an almost inexhaustible supply of suitable earth, sufficiently dry for the greater part of the year, and for the remainder, readily prepared for use by the labor and other facilities obtainable there. The ashes of the establishment, of which there must be a large quantity, could be also economically utilized.

The advantages of the "Dry Earth" plan depend upon the deodorizing, disinfecting, and absorbing properties of the earth. Not all kinds of earth are suitable; it must be dry, it should contain alumina or iron, or be "powdery to give it sufficient absorbing power;" it should be free from sand or gravel, and the arrangement of the closet should be such that a sufficient quantity of earth will be, with certainty, deposited upon the foecal discharge—enough to cover it and to absorb the urine.

But, though the dry earth thus used is an efficient deodorizer, it is essential that the accumulations should be promptly removed. The success of the plan depends entirely upon the regular and systematic manner in which the deodorization and removal of the compound are effected. In a public institution this can be controlled—the necessary supervision is easily obtained. For such institutions the above plan has been particularly recommended by almost all sanitarians, wherever the discharge of sewage cannot be made into a river, or when such a disposition of it would be likely to result in injury to others.

The quantity of earth required is usually estimated at from one and a quarter to one and a half pounds per head per diem. With five hundred persons at the prison, there would be consumed, say, seven hundred and fifty pounds of earth. Estimating a cubic yard of such earth to weigh 3,240 pounds, it would take 273,750 pounds per year. An acre of ground denuded to the depth of one foot would yield 2,420 cubic yards. The problem may be stated thus: Five hundred men require, at the rate of one and a half pounds for each man, seven hundred and fifty pounds of earth per day, or 273,750 pounds per year; or one acre denuded to the depth of eighteen inches would supply earth for five hundred men—one and a half pounds per day per man—for twenty-eight years.


SOLDIERS' EARTH CLOSETS AT FORT ADAMS. NEWPORT R.I.

The resources of the location are ample. They appear to be practicably limitless. But, in practice, it is ascertained that the same earth, when dried, may be used over and over again, and, in fact, this is done when it is considered desirable to increase the fertilizing properties of the earth for commercial purposes. Indeed, when the market value of the material has been a prominent consideration it has been customary to charge it from two to five times.

"In 1874, Mr. Netten Radcliffe alone made an examination of the privy system generally, and again inquired into the condition of the earth system. * * * After this wide observation, he says, without qualification: 'As a means of abating excrement nuisances, the dry earth system is of the utmost value.' And again: 'Of the value of dry earth as a means of abating the excrement nuisance, no question, I presume, now exists; and its application in detail to this purpose has been facilitated to the utmost by the ingenious mechanical arrangements devised and patented by Mr. Moule. * * * The arrangements, which provide for proper charges of dry earth being thrown upon the deposited excrement, admit of ready adoption of the system in houses, schools, and other institutions.'"

William H. Ford, in "Buck's Hygiene and Public Health," says: "The dry method is an exceedingly convenient, economical, and efficient means of excrement removal where water-closets cannot be used. For country houses, villages, small towns, and, under certain circumstances, for schools, prisons, and charitable institutions, this arrangement is certainly a most desirable one."

Dr. Voelcker, Chemist to the Royal Agricultural Society of England, says: "Nothing effects so complete and rapid a deodorization and disinfection of putrid animal matter of every kind, as a well aerated soil. * * * Mr. Moule has the merit of having given to the public a simple and ingeniously contrived apparatus, which is capable of doing good service in many places; more especially in sick rooms, public establishments, such as county prisons and unions, and country houses, where a good supply of water cannot be commanded; and credit is due to him for having pointed out the repeated action, and consequently the fitness for repeated use, of the same earth." All that is necessary in the preparation of the earth for repeated use, is that it be spread under a roofed shed and dried.

The plan proposed is not recommended on account of any advantage it possesses over the water carriage system; for it, or any other substitute, is far inferior in a sanitary point of view. It is advised solely on account of the danger likely to occur from the continued use of the latter under the circumstances existing at the prison. For the disposal of the solid excreta at the prison, the earth system has advantages by way of a certain pecuniary return, and although it might not, as an independent investment, prove profitable, the product has a certain market value, which would, possibly, go far towards defraying the expenses. A pretty extensive and intelligent farmer, not many miles from Folsom, stated, in conversation the other day, that the farming lands in his neighborhood would soon suffer in consequence of the constant drain upon them by successive crops; that the scarcity of manure was now, and would become, more and more seriously felt; and that, in the absence of stable manure, the use of guano, or some other fertilizer, would soon become a necessity. The material derived from the dry earth system could be used to supply this want. After proper admixture, it might be stored away in barrels or sacks under shelter, and disposed of to those needing it. It is inoffensive, and may be kept, in a dry state, for an indefinite period. By its use, the productive capacity of many farms within easy access, now weakened by continuous crops, might be restored, and acres now idle and unproductive, might be brought under successful cultivation.

In this scheme of partial remuneration for the expense and trouble attendant upon the plan proposed, there is nothing vissionary. It has been tried under far greater difficulties, and though it is probable, as just stated, that the manufacture of poudrette would not be profitable, as an independent investment, the circumstances under which it would be conducted at the prison would give it many advantages over private enterprise. But the fact, whether or not profitable, if the proposed disposition of the excretal discharges of the prisoners be accepted as wise and judicious as a sanitary measure, should not be made a controlling motive. The State has a duty to perform in this matter, which is above and beyond all pecuniary considerations. The question is, whether the sewage of the prison shall be permitted to flow into the Sacramento River, to pollute the water consumed by the people of the Capital of the State, exposing them to the great risk, even if not to the certainty, of injury. This should be avoided at any cost. The plan recommended has been selected over other plans, because it can easily be made efficient by a small expenditure. It is better adapted for the special purpose in view—the disposal of the solid matter—than the irrigation, or any form of the filtration systems. The cesspool system is a nuisance under any circumstances, and should be tolerated only as a necessity, where other more rational methods are impracticable.

The purification or precipitation processes seem to be inapplicable to the situation at the prison, at least, so far as concerns the solid excreta. They are expensive, and, even if successfully carried out, would still leave the sewage unfit for discharge into a stream so soon to be mingled with the drinking water of a large population. It is estimated by Frankland, that the amount of the bowel and kidney excreta, which alone we are now considering, reaches daily, in adults, three ounces of fœces and forty ounces of urine (by measure). If the weight of urine were equal to that of water, which is not commonly the case, there would be discharged from a prison of five hundred inmates, 93.12 pounds of solid and twelve hundred and fifty pounds of liquid excreta daily, or nearly eleven and a half tons of the one and over two hundred and twenty tons of the other per annum.

The question arises: Is the conservative influence of dilution sufficient to render this amount of filth innocuous?

So much for the excreta, solid and liquid.

But there is another kind of sewage to be provided for. There is the refuse from the kitchen, and the baths, and house water of all kinds, containing a greater or less quantity of dissolved or suspended animal and vegetable matter, ready to decay. The admission of the sewage water into the river can, in no sense, be justified, unless it be previously purified by some one of the processes devised for the purpose. Some of these have already been alluded to. There is the "Precipitation Process," either by natural subsidence of the suspended matters in tanks, or by purification by lime, or alumina, or phosphate of magnesia, or by various compounds in which the above with clay, zinc, blood, charcoal or perchloride of iron, more or less enters. The product obtained by any of these processes is collected and dried, and the liquid is permitted to pass into the stream, or may be used for irrigation.

The question proposed by Dr. Parkes is a pertinent one: "When the sewer water is cleared by any of these processes, is it fit to be discharged into streams? In the opinion of some authorities, if the precipitation is a good one, it may be so, and it appears certain that in many cases it is a tolerably pure water. * * * But it still contains in all cases some organic matter, as well as ammonia, potash, or phosphoric acid. It has, therefore, fertilizing powers certainly, and possibly it has also injurious powers. No proof of this has been given, but also no disproof at present, and when we consider how small the agencies of the specific diseases are, and how likely it is that they remain suspended, we do not seem to be in a position to expect that the water, after the subsidence of the deposit, will be safe to drink. We must adopt, I believe, the plan which is safest for the community, and the effluent water should, therefore, be used for irrigation, or be filtered before discharged."

This brings us to the Filtration plan, or the mechanical separation of the liquid from the undissolved particles of the sewage by passing through a body of porous earth, sand, gravel, or other filtering medium.

The action is not only mechanical but also chemical, oxidation of the organic matters taking place by virtue of the air contained in the earth or other material used; this organic matter being thus converted into carbonic acid, water, and nitric acid. When the filtering material is sufficiently great, and the sewage has been previously deprived of its coarser particles by screening, the filtering process, properly conducted, is thought to render the water sufficiently pure to be admitted into a stream. The conditions necessary are: a porous soil—better if it contain oxide of iron and alumina—an effluent drain not less than six feet from the surface; an inclination of the ground suitable to allow the sewage to flow over its entire surface, and a division of the filtering area into four equal parts, each part to receive the sewage for six hours, and allowing an interval of eighteen hours before it is used again. It is considered that an acre of land thus divided would dispose of about 100,000 gallons of sewage daily. According to Dr. Parks the filtering area should not be less than one cubic yard for eight gallons of sewage daily—twenty-four hours.

Experiments made by the Rivers Pollution Commissioners (England) to test the value of the filtration process, show that when the above conditions are fulfilled, the whole of the sediment was removed, and that nitrates and nitrites, which did not exist before filtration, were found, thus showing the effectiveness of oxidation. It is desirable, for sanitary purposes, that crops should be planted on the land.

The only other plan for purifying liquid sewage so as to render it suitable for admission into a river, is some form of irrigation, or the passage of sewage over and through land with the view of bringing it speedily under the influence of plants.

Simple irrigation, or the discharge of sewage upon land unprepared for the purpose, and without deep underground drainage, has properly been abandoned. The present is really a combination of the *irrigation* with the *filtration* systems. The soil should be properly prepared for the purpose. Flat, or gently sloping land is the best.

This is to be laid out in broad ridges or furrows, the ridges having a gentle slope of about thirty feet wide, with a conduit on the summit or crest, along which the sewage is conveyed. When the channels are full, the sewage water overflows and runs gently down the slopes, and, being absorbed by the soil, is carried off into the water courses by drains five or six feet deep.

The effect of this process upon the sewer water is said to be, a mechanical arrest of suspended matters; an oxidation and consequent nitrification, due to the porosity and physical attraction of the soil, and chemical changes. "The sewer water," says Dr. Parks, "should reach the ground in as fresh a state as possible. It is usually run through coarse strainers to arrest any large substances which find their way into the sewers, and to keep back the grosser particles which form a scum over the land. It is then received into tanks, whence it is carried to the land by gravitation, or is pumped up. The carriers of the water are either simple trenches in the ground, or brick culverts, or concreted channels, and by means of simple dams or gates the water is directed into one or the other channel as may be required."

The amount of sewage that can be disposed of by this means will depend upon the porosity of the soil, and the rain-fall. According to the best authorities, the amount of land set apart for the purpose should not be less than one acre to each one hundred persons. This will take, upon the right kind of soil, 2,000 gallons in twenty-four hours. The land may be subdivided so as not to receive sewage two days in succession. If the object be to purify the sewage of its organic matters so as to render it fit to be introduced into a stream, the sewage is then applied to each subdivision alternately.

Mr. C. E. Waring highly recommends a system of sub-irrigation, which would seem to be well adapted to the situation at the prison. As originally proposed, it is described as follows:

> The house drainage is discharged into a tightly cemented tank, four feet deep and four feet in diameter, entering near its top, which is arched over and closed by a tightly fitting stone cap, and thoroughly ventilated. Its outlet pipe, starting from a point one foot below the surface of the water and about two feet below the cap-stone, passes out near the surface of the ground and is continued, by a cemented vitrified pipe, to a point about twenty-five feet further away; here it connects with a system of open-jointed drain tiles, consisting of one main, fifty feet long, and two lateral drains, six feet apart, and each about twenty feet long. These drains underlie a part of the lawn and are only about ten inches below the surface. During the growing season their course is very distinctly marked by the rank growth of grass over and near to them, the difference of growth in the immediate vicinity being so great that, were the work to be done over again, I should place the lines but three feet apart. The slope of the ground is very slight, probably not more than fifteen inches between the extreme ends of the system, yet, judging by the growth, the distribution is very uniform throughout all the pipes. * * * Successful though this experiment has been, I have recently adopted a small Field's Flush Tank, in the belief that the system would be improved by having the discharge intermittent, so that the flow of water, being more copious, should saturate the ground for a greater distance, and that, with considerable intervals during which there is no flow, there would be complete aeration of the ground. * * * The purpose of this apparatus is to prevent the constant trickling away of the small stream usually flowing from the houses, with too little movement to carry forward obstructing matters, such as are sure, sooner or later to clog any ordinary house drain. * * * From its intermittent action, also, it fills the ground for a short time, and then, as the liquid subsides, fresh atmospheric air enters the soil and assists, by its oxidizing action, in the work of purification.

This work of purification is very much aided by the vegetation growing upon the ground. Evidence was adduced before the French Horticultural Society to show that while water containing putrefying organic matter retains its putrescency if left to itself, it entirely loses the *bacteriæ* which accompany putrescence when subjected to the influence of growing plants, and contains only the larger *infusoriæ* common to good water. In five days the water acted upon by a living root lost all its bad smell, and became purified. Mr. Waring closes by saying:

> For how large a community the Denton and Field storage tank might be made useful we have as yet no experience to determine. All that can be said for it at the present time is, that, so far as private houses, factories, hotels, asylums, and small communities are concerned, it offers a means for the complete solution of the slop question in a manner that will give at least some return for the outlay, for in every case where this underground irrigation is used there is sure to be a greater or less increase of fertility.

The engine at the prison could easily be so arranged as to pump the liquid sewage of the institution to any desired point, whence it could be distributed through the flush tank to any part of the grounds. The plan would unite efficiency with economy, and greatly contribute to the productive capacity of the soil.

I have thus considered briefly, but with sufficient detail, I trust, to be understood, the various methods which have been devised for the disposal of sewage. The question has been divided, as it ought to be, into means for disposing of the solid or fœcal contents, and those which relate to the liquid sewage; and the conclusions arrived at have been such as the peculiar situation at the prison, the topography, the amount of sewage, the facilities for obtaining land of the proper kind, and cheap labor seemed to suggest. The question is one of importance, intimately concerning large populations compelled to use, indirectly at least, the water of the American river, and the duty of the State in relation thereto. If the investigations of sanitarians be of any value, if they have demonstrated anything conclusively, it is that water, polluted by just such sewage as now enters the Sacramento river at Folsom, is dangerous to health.

FACTORIES AS SANITARY AGENTS.

By J. P. Widney, M. D., Member of the State Board of Health.

In almost every town and city is to be found a quarter of one especial topographical character noted for its unhealthfulness. This quarter is low, often boggy, and malarious. It is commonly at once to be picked out by the poor class of dwellings erected there, by the foul odors, and by the general air of neglect and dilapidation. Upon the city health reports it is marked as the ward which, in proportion to its population, suffers most from the ravages of diphtheria, scarlet fever, malarious and typhoid fevers, and foots up at the end of each month the largest proportionate death rate. The better classes of population avoid it. Only those whose limited means compel them, live in it. And so, year after year, while other portions of the city increase in wealth and population, this remains nearly at a standstill. The city grows around it until it becomes an eyesore in the heart of population, and a hotbed of disease, which constantly menaces the health of the surrounding districts. Yet it is often that part of a city which, by its level surface and contiguity to a water front, should be one of the most desirable for many purposes. Such a district is found in San Francisco, in the Mission Bay flats. A somewhat similar quarter existed ten years ago in Los Angeles. It was the triangle bounded by Alviso and Alameda Streets and the river. It was known among physicians as the fever district. It is a low river bottom, entirely of alluvial formation, and the sweep of the sea breeze was in a measure fenced off by rows of willow trees lining the roads and dividing the fields. About that time this property was thrown into the market, and portions of it sold out in town lots and built upon. The houses were mostly small one-story frames. Malarial fevers at once attacked the population of this quarter, not in any very fatal form, but so persistent, and recurring so constantly, that many persons abandoned their houses and moved away. The quarter gained so bad a reputation for healthfulness that property became unsalable, and so remained for several years, many of the houses already built standing tenantless. After this, however, factories began to locate upon these lands, drawn by their cheapness, the level grades, and nearness to the business portion of the town, and to the railroads. The city gas works were removed to lower Alviso Street; with fires going night and day, pouring out the smoke and fumes of tons of coal each twenty-four hours. Several large steam flour mills were erected, running with relays of men night and day. An iron foundry and several lumber mills began work. A large distillery was built just across the river. The steam pumping works of one of the city water systems were located in another portion of the tract, while the extensive workshops and station of the Southern Pacific Railroad occupied another, and the coming and going of many trains each day from the transcontinental, the Anaheim, the

Wilmington, and the Santa Monica roads, besides some half dozen locomotives standing much of the time, with fires going, upon side tracks, added to the gases and smoke which began to settle down over this unhealthy district.

The necessities of the workmen employed at these various factories compelled again the settling of population over the ground which had before been so fruitful of malarious diseases. Now, however, although there is absolutely no drainage for the district, everything having to seep into the sandy soil, malarial diseases are rapidly disappearing, and what used to be known as "the fever district," is losing its distinctive appellation. There has, it is true, been some cutting away of the willow hedges, but the planting of fruit and shade trees has probably kept even with the clearing process; so that this can hardly be considered a factor in the change which has come to the healthfulness of the locality. It can only be ascribed to one cause, the setting loose in the air, more especially at night, when the sea breeze has died away, leaving the atmosphere stagnant, of the smoke and gases of all these tons of coal daily consumed by the gas works, the factories, and the locomotives. As a result, land which, before, was almost worthless, has rapidly appreciated in value, and a central portion of the city area has been transformed from waste space to productive and valuable property. Neither does this district now stand as a constant menace to the health of the adjacent portion of the city.

The facts which I have given are not new. The same thing has been noticed at times in other cities. But now for the practical conclusions: Would it not be a wise thing for cities, by municipal legislation, and by the offer of especial inducements and privileges, to secure the location, in these malarious districts, of the factories, gas works, mineral and acid works, railroads, foundries, smelting works, and all the many industries which crowd into a city, and which, by fires or chemical process, turn loose in the air the smoke and gases of combustion or chemical action, and thus reclaim them, while at the same time freeing other portions of the city from the smoke and fumes which to them are a nuisance?

If the manufacturing industries of San Francisco could be located along the line of Mission Creek, the monthly report of the Health Officer would no doubt present a very different showing for that portion of the city.

THE SEASIDE HEALTH RESORTS OF CALIFORNIA.

By F. W. Hatch, A. M., M. D.

A good deal has been written at different times in the public press, and in the medical journals of this and other States, upon the sanitary advantages of some of the more or less popular health resorts of California, and the State Board of Health has added to these, from time to time, in its biennial reports, especially in their relation to consumption. The subject is an interesting one, and may not inappropriately form the subject of a more general report than has hitherto been attempted. It is a theme upon which much may be said—too much to be exhausted in a single paper; we can only hope to present a few facts, drawn mainly from personal observation, in relation to some of the more prominent places of resort of which the State contains so many. The consideration of this subject has been suggested in consequence of the numerous applications to the Secretary of the State Board of Health for specific information relating thereto. As an answer to these applications, no better method presents itself than a general review in the pages of the biennial reports of the Board.

There are some difficulties attending the investigation of this subject. The climatic features of different portions of the State are so distinct—the difference between the coast, valley, and mountain regions especially, are so well marked, and the influence of a prolonged residence upon the inhabitants of each must be so varied, that it is not easy to determine the particular locality which, resorted to by residents of our own State, for example, would be most desirable as a *change*. It is assumed that a change of climate, occasionally, is desirable for most persons; that the man of business, the eager, calculating merchant, the worn and weary speculator, the plodding professional man, need relaxation of mind and rest for the body; that our wives need relief for a time from the monotonous, and oftentimes irksome, demands of household duties, and the yet more exacting claims of social customs, and our children from the discipline and confinement of the school room; that the resident of the metropolis may profitably take refuge for a time from the fogs and mists which prevail there during the Summer; and the citizens of the valleys may with equal profit flee from the hot sun and, to many, the relaxing atmosphere of the interior. Nature seems to demand a change of some sort, and the physician is often asked, "Where shall I go?"

No reference is here made to any special disease, or to those who can be strictly called *patients;* but only to those seeking relief from the wear and tear of busy life, or the effects of certain local climates upon the general health.

But the subject has a much wider range of importance. The number of visitors to California is annually increasing. Many come for recreation and pleasure, to enjoy the genial climate, to view the gorgeous scenery of our mountains, to visit our watering places, or wander among the vineyards and orange groves of San Gabriel and Riverside. Many others visit us, as invalids, attracted by the sanitary advantages with which the State has been accredited, and the glowing pictures which enthusiastic pens have drawn of the almost marvelous curative virtues of our southern coast.

For this large class, information is needed—authentic information—to correct false impressions, and to guide them to a proper selection from the many really excellent sanitary resorts our State possesses.

Probably nothing has more injured the reputation of California as a health resort than the wild statements which have been made in relation thereto, the erroneous views which have been spread abroad, and the consequently injudicious selection by the invalid of a place of resort. This is especially true as regards our watering places and mineral springs, to which the invalid has often been directed by unwise counsels, and from which not only has no benefit resulted but, sometimes, positive injury.

For the purpose of the present report, only that portion of the State lying along the coast can be properly considered. Opportunity offering, other climatic divisions of the State will receive attention at another time.

In pursuance of this plan, it is proposed to review the principal watering places and health resorts lying south of San Francisco.

Northerly, the objectionable climatic features—the winds and mists—which, during the Summer months especially, render that city objectionable as a home for the invalid, particularly the phthisically inclined, prevail, for the most part, to an even greater degree. A few isolated localities, as a portion of the region about Bolinas Bay, and at Olema, may be considered exceptions. The latter is, however, several miles in the interior, and it may be remarked, in passing, presents a pleasant retreat, sufficiently exempt from the winds prevalent nearer the coast, and protected, in great measure, from fogs, where the invalid may, at the proper season, find a pure air and healthful exercise and enjoyment with rod and gun. The writer, when recovering, some years since, from a severe attack of pneumonia, found substantial benefit from its agreeable and invigorating climate.

South of San Francisco are many points of interest to the valetudinarian. Passing by Pescadero and other places having a local reputation, we have the well-known watering places of Santa Cruz, Monterey, and Santa Monica, and the popular health resorts of Santa Barbara and San Diego.

There is something in common in the climatic features of each of these places, though differing materially in the extent to which they are manifested. The winds from the ocean which prevail at San Francisco from April to October, are felt along the coast even as far as San Diego, though modified, as we proceed southerly, by local causes. At Santa Cruz, for example, the winds from the northwest are shut out, to some extent, by the wooded mountains on the north of the Bay, and, as explained by Dr. C. L. Anderson of that city, modified by a counter land current or eddy which, warmed by the the land or sun, usually possesses a mild temperature.

Monterey, (town) situated on the southerly side of the Bay, likewise presents a marked and agreeable contrast from what is observed at San Francisco.

Passing southerly, or rather southeasterly, to Santa Barbara, further and more decided modifications are noticed. "The number of foggy days may be said, as a general rule, to become less subject to slight local deviations. The severity of the summer winds is markedly subdued, the temperature somewhat higher and more equable, the rainy season shorter, and the rainfall less abundant, and intervening between these two seasons of Winter and Summer, a short season representing Spring, which becomes more and more attractive, inviting by the mildness of its temperature, the purity of its atmosphere, the early freshness and beauty of its vegetation, and combining all those qualities which have given to this region its popular reputation as a resort for health." *

Four hundred and eighty two miles below San Francisco, we reach the southern limit of the district under review, at San Diego, where, in addition to the modifying influences already spoken of as applicable to Santa Barbara, we have others arising out of the topography of the town and its harbor. Northwesterly winds prevail at the usual season as at other points, but they are materially tempered, and only exceptionably disagreeable.

In considering more closely these different resorts of the coast region, we find, at Santa Cruz, one of the most popular watering places of the State. As already observed, the prevailing winds along the coast are from the northwest, but they are more or less varied, both in force and direction, by local causes. From the meteorological observations taken by Rev. Mr. Willey, in 1874, we find, during the season from April to October—214 days—a northerly wind—north-northwest, or northeast, at 7 A. M., during 31 days; at 2 P. M., 24 days; at 9 P. M., 38 days, and a southerly wind at each of these hours—175, 165, and 177 days respectively.

The following table will serve to illustrate the temperature and humidity of the place for the same year:

Mean Temperature and Humidity at Santa Cruz, 1874.

Months—1874.	Mean Temperature.			Mean Rel. Humidity.		
	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.
January	--------	--------	--------	--------	--------	--------
February	49°.5	55°.7	55°.3	76°	81°	87°
March	52°.6	57°.2	55°.4	80°	87°	100°
April	58°.3	64°.06	62°.9	82°	77°	72°
May	62°.1	67°.7	64°.5	77°	79°	83°
June	63°.6	67°.7	66°.6	78°	89°	84°
July	63°.3	70°.5	66°.2	78°	80°	79°
August	62°.2	71°.8	66°.6	88°	80°	84°
September	61°.3	70°.2	65°.1	82°	80°	84°
October	56°.5	59°.6	56°.2	81°	94°	75°
November	61°.0	64°.2	63°.0	82°	83°	78°
December	48°.1	55°.1	50°.2	85°	68°	80°

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* Report State Board of Health of California; Article, Relations of Climate to Consumption—1877-9.

As compared with San Francisco, the mean temperature for February is 1°.5 higher; for March, 1°.0 higher; for April, 5°.9 higher; for May, 9°.8 higher; for June, 7°.7 higher; for July, 8°.6 higher; for August, 11°.5 higher; for September, 16°.4 higher; for October, 0°.6 lower; November, 5°.7 higher; and for December, 1°.4 lower. Some allowance should be made for the fact that the observations at San Francisco were taken in 1876, and those for Santa Cruz in 1874. The difference in the climates of these two places is more prominently observed, however, in the relative force of the winds and the frequency of fogs or mists.

Aside from the agreeable change from San Francisco, on the one hand, and the heated atmosphere of the interior, on the other, which annually draws many from these sections, the chief attraction of Santa Cruz consists in the facilities it affords for sea-bathing. For this purpose it has been more generally known and resorted to than any other locality, and the popularity it has attained is merited, not less by its agreeable, bracing air, than by the excellent accommodations it affords for visitors, and its facilities for access by two railroads.

A new and superior water supply for the city has recently been obtained from Major Cree, in the Coast Range Mountains, clear, sweet, soft, and abundant. It is far preferable to the former water obtained from San Lorenzo River. Running through deep cañons, it is not subject to pollution in its course. Viewed strictly in a sanitary point of view, it is as a *watering place* that Santa Cruz is to be considered, yet its advantages in this respect cannot be separated from that of the sea air. Its effect upon disease is to be represented by both of these influences. In fact, it is a serious, though not yet quite settled question, whether the physical and therapeutical effects observed in those who resort to our seaside watering places, are not to be ascribed to the properties of the sea air, the character of which has been so well described by Braun as consisting of "the powerful stimulation of the change of substance, both retrogressive and formative, expressed in the striking increase of urea and decrease of uric acid and phosphoric acid in the urine, in the greatly increased requirement of food, and in the rapid and considerable increase in the weight of the body." In other words, it exercises an invigorating and bracing effect.

As compared with air of the interior, sea air is lower in temperature and more equable than the former; the Summer heat and the Winter cold are alike less intense; in consequence of the constant evaporation going from the surface of so immense a body of water, the absolute moisture of sea air is greater; it is more pure and free from organic matter, in consequence mainly of the air currents which prevail; it contains more ozone; less carbonic acid, though the difference is inconsiderable; its chloride of sodium, or common salt, mildly excites the respiratory membrane, thus, in connection with its increased moisture, giving it a salutary effect on many bronchial diseases and cases characterized by defective nutrition.

But while it is true that the effects of a visit to the seaside are to be ascribed, in a very essential part, to the sea air, those of which sea-bathing is productive are not to be lost sight of. These effects can only be considered in a general way. They are not unlike those of an ordinary cold bath, except as modified by the stimulating and exciting character of the water, and its constant agitation—the impulse of the waves and the surf. Its effects are different, too, according to the temperature of the water, and the duration of the bath. The temperature of the skin and blood are at first lowered. The skin exhibits the influence of the shock by the contraction of its muscular fibres, its pallor, its altered sensibility; the pulse and respiration are at first reduced in frequency, but soon become quickened; the central organs of the nervous system exhibits its effect by tremor of the limbs, or by lassitude and numbness, and the lungs by a certain amount of embarrassment, or oppression of the chest, or even gasping for breath. Then follows the reaction; the temperature rises; the skin relaxes and its sensibility is restored; the respiration is relieved and the bather breathes freer, and the organic functions are stimulated to renewed activity. In general, the colder the water the more active the reaction.

But beside these, the ordinary effects of the cold bath, the mechanical influence of the chlorides contained in sea water is not to be disregarded. The circumstances attending the bath, too, are different. Sea bathing involves a certain amount of exercise in walking to the beach, some excitement to the nervous system as well as some muscular exertion in struggling with the waves, or in swimming. The water is largely impregnated with salts, increasing its density, and, as just observed, rendering it stimulating and exciting to the skin, and this stimulation is increased and prolonged by the saline deposit left upon the surface, and the subsequent friction. The late Dr. Bell, who ascribed considerable influence to this latter consideration, remarks: "That such deposit is really formed on the skin, any one may easily satisfy himself by applying the tongue to any part of the surface, even after several days have elapsed from the last time of bathing." Sea bathing presents, therefore, a more complex problem for consideration than the ordinary cold bath. It is a positive agent, capable of doing harm as well as good, and should not be resorted to carelessly or indiscriminately.

The temperature of the water at Santa Cruz, during the bathing season, is lower than that at some other watering places. Observations taken by Rev. Mr. Willey, referred to in a report of the State Board of Health, 1877, show the temperature to have been, in June, 58°.2; July, 60°.4: August, 60°.2; and September, 60°. These observations were taken were taken at eleven o'clock, A. M. There would be a difference in the temperature at full and ebb tide—the state of the tide is not stated. On the coast of England, the temperature of the sea is said to average, during the Summer months, 63°, and at times, to reach 70°. The Summer temperature of the Mediterranean is given at 72°.5 to 80°.6; that of the Bay of Biscay, 73°.4; of the German Ocean, 60°.8 to 68°. Bell states that he found the temperature of the ocean at Newport, Rhode Island, in the early part of the month of August, to be 77° Fah. at eleven o'clock A. M.

Reliable figures of the temperature of the ocean at the principal watering places of the United States, are not available, although observations made by Captain R. J. Edwards, on the Atlantic coast, near Newport, reports for June, 61°.7; July, 69°.8; August, 70°.4; and September, 65°.3. This would give an average for the season of 66°.7 for Newport, and 59°.9 for Santa Cruz.

From the same source (Rev. Mr. Willey) we have obtained a record of the *air temperature* at Santa Cruz, taken at the same time and place, showing 60°.2 for June, 61°.8 for July, 63° for August, and 61°.3 for September; the average being 61°.7, or 2° higher than the water. This is favorable for the comfort of sea-bathing. Yet it is evident that with a somewhat higher temperature the ocean at Santa Cruz would be available for a much larger and more varied class of invalid bathers than it now is. As a matter of fact, it is probable that the popular season for sea-bathing there may be said to be from July to September inclusive, and the temperature of the water then averages 60°.2. This would place it within the lowest limits fixed by Braun, 59° to 66°.2, but still exclude it from what are considered preferable for the invalid, 66°.2 to 71°.6.

For the large majority of those visiting the watering places, those not to be considered invalids, but seekers after recreation and pleasure, retiring for a time from the confinement and annoyances of business in the metropolis, or from the enervating influences of the malarial valleys of the interior, Santa Cruz presents most excellent advantages, in its fine beach and other facilities for bathing, its comfortable accommodations, its pure air, and its beautiful drives.

For those weakened by disease, for delicate females, and anæmic children, for that class who visit our watering places as real invalids for the anticipated benefit of sea bathing, a higher temperature would be desirable.

A course of sea-bathing is not to be undertaken rashly, nor without a proper regard to the nature of the disease and the constitution of the invalid. But, even for those to whom the pleasures of surf-bathing may be denied, there is the pure sea air, with its bracing, invigorating influences, and which are nowhere better represented than at Santa Cruz. There are also warm sea water baths to be obtained for those requiring them.

In general there are no rules taught or observed at our watering places as to the proper use of sea bathing. Everything is left to the fancy or caprice of the visitor, beyond, perhaps, general caution for safety to those requiring them. Hence, this valuable means of medication not only often fails of doing good, but sometimes becomes the agent of serious evil. No fixed or definite rules, indeed, can be laid down, as much must depend upon the circumstances of the individual, the temperature of the water, etc. Yet certain general precepts should be borne in mind, such as the number and duration of the baths and the hour. The duration of the bath suited to those of different age and constitution cannot well be predicated. The young adult, robust and inexcitable, will bear a bath of longer duration than the weak and delicate. The general precept is to leave the water before the temporary reaction is over and the second chill is felt. The weak feel this the most; the young and vigorous may scarcely feel it at all. Commonly, the period for invalids will vary from two or three minutes to fifteen or twenty.

It is a good rule never to bathe on a full stomach; let it be a short time before meals, or a sufficiently long time after meals for the work of digestion to have been in a great degree completed, or, commonly, three hours. During digestion, the nerve force is partly engaged in that work, and the engorgement then present in the internal organs is liable to dangerous aggravation. Custom at bathing places has properly designated the forenoon. Digestion of the early morning meal has then been completed, and then both air and water have felt the warming influence of the sun. The state of the tide may influence the selection of an hour for bathing. When the full tide occurs late in the forenoon or early in the afternoon, the water is some degrees warmer than at low tide.

These rules are especially to be observed by invalids. The well and robust may take greater liberties with impunity. As a general practice, no more than one bath should be taken daily.

Sea bathing is a tonic, and as such is admirably adapted to conditions of general weakness arising from mal-nutrition in the organs of assimilation or deficient innervation, but unassociated with organic disease. Cases whose causation may be included in the general term *overwork*, some forms of the neuroses, anæmia, chlorosis without heart lesion, chronic malarial disease, which had proved intractable to ordinary medication, are adapted to this treatment. Its beneficial influence, considered as a hygienic measure, is manifested upon the skin, especially in children. The capillary circulation is excited, and the pale, white complexion assumes the ruddiness of health; the appetite improves; the muscular strength increases; and the nutritive processes are carried on more vigorously.

We cannot repeat, nor is this the place to do so, the long catalogue of maladies supposed to be benefited by this agent. Among them are scrofula, especially during childhood, scrofulous affections of the joints, nasal catarrh—that form in which the individual is continually "catching cold" upon slight exposure—bronchial affections not dependent upon pulmonary lesion, disorders of menstruation, particularly menorrhagia, uterine congestion with relaxation of the ligaments, leucorrhœa, etc.

It is more important in a hygienic point of view, and more conformable to the purpose of this paper, to endeavor to point out its contra-indications. It is generally admitted that sea bathing should be *avoided* in cutaneous affections, and, except in the form of warm baths, in rheumatism—though purely muscular rheumatism has been considered an exception to the rule; generally in chorea and epilepsy, and particularly in organic diseases of the lungs and organs of circulation. Several cases have been brought directly under the attention of the writer where imminent danger resulted from inattention to this latter caution. Hence the importance of having some regulations at all our bathing establishments by which visitors, particularly invalids, may be instructed as to the use of the baths.

But aside from these considerations touching the fitness or unfitness of sea bathing as an expedient in special diseases, and regarding only its applicability to the very great majority of those who frequent our seaside watering places, it may be said, taken in connection with sea air, change of climate and habits, and the effect upon the mind of the "grand aspect of the majestic ocean," to be eminently restorative in those states of the system which, for want of a better name, are generally denominated *weakness*.

A swimming school has been established at Santa Cruz for the youth of both sexes, under competent and experienced teachers. It is confined to San Lorenzo Creek, just above its point of discharge into the bay, accessible to the cars, which run every few minutes between the creek and the city. This is an important enterprise, worthy of substantial encouragement, affording to those who avail themselves of it an accomplishment, the value of which cannot be overestimated. As an exercise for developing bodily strength and vigor, the practice of swimming has no superior, while the consciousness of the possession of the art affords a security which, in the hour of danger, is incalculable; simply as a hygienic measure it deserves encouragement. It ought, when practicable, to be made a part of the education of every child. It is easily learned, is of much more practical value than many of the studies enforced in the schools; and yet, prudently pursued, instead of preventing the acquisition of these, it imparts the vigor of mind and body so much needed by the student.

This river is smooth and shallow during the bathing season, is safe, and, so far, better adapted than the surf for the purposes of a swimming school. Bathing here is, however, at present, not free from another quite serious danger. For a mile or more above its mouth it has been made the place of deposit of the sewage of hotels, livery stables, and private residences lying in proximity to its banks. Examination showed foul accumulations of sewage, the more liquid portion constantly running into the river. The water at the point where bathing is practiced is evidently unclean, and shows floating particles of what may well be sewage. There is an odor about the place, also, which indicates the source of pollution and the presence of polluting admixture. This is certainly a source of danger to swimmers which ought not to be overlooked. The incoming tides, which extend far up along the river, take up the sewage accumulations and the foul water, and with their outgoing, carry them off into the bay; but, as is known to be true of all such cases, the undissolved portions of sewage float in and out with each rising and ebbing tide.

A system of city sewerage adapted to the use of all portions of the city, and an ordinance, properly enforced, prohibiting the discharge of sewage into the river, would seem to be plain duties of the authorities. Something ought to be done to make this river pure and fit for bathing, for as an adjunct to the surf baths it is invaluable for the purposes named. Under present circumstances, there is evident danger attending its use.

All are not so situated as to take advantage of schools for swimming, or even to learn to swim at all. But if every one, being unexpectedly immersed in deep water, could preserve his presence of mind—a most difficult thing to do under such circumstances—fewer lives would be lost by drowning. The human body, in consequence of the air contained in some of its organs, as in the lungs and digestive canal, is lighter than water, and, by proper action, may easily be sustained at the surface. Every swimmer is familiar with the fact of his ability to float upon the surface of the water, with his mouth and nose free to carry on the acts of respiration, by simply keeping the rest of the body covered, with his hands by his side, or, better still, behind his back; and this position may be maintained for a long time. In this connection, the following extract from a paper by Dr. MacCormac, of Dublin, copied from the report of the State Board of Health of Michigan for 1877 (article by Dr. R. C. Kedyie), is appropriate, and will prove interesting and valuable:

> The means of safety, or relative safety, which I have to point out, are so very simple, and, as I believe, so very effective, that I am lost in wonder that no one has thought proper to insist upon them, as in the following remarks it is my intention to do. Swimming, as ordinarily practiced, is not the most sufficing means for escaping the dangers of the water. It needs some instruction to be able to swim, and practice to be able to swim well. No doubt it is desirable to be able to swim, and to swim well. But the great majority of persons of both sexes do not

know how to swim at all. Yet, unless people can swim, and swim well—and even then they are not always successful, when the emergency comes, in preserving life—swimming is, I am persuaded, not so effective a preservative as conjoint paddling and treading water. As a rule, subject to few exceptions, persons precipitated into the water do not swim without previously learning. But paddling with the hands and treading with the feet require no prior instruction, and in the great majority of cases would save life. In swimming, the mouth is on a level with the water in the interval of the strokes; in paddling, the head is well elevated; the individual is able to look about; he can deliberate as to what is best to be done, and he is much less liable to take water into the larynx, or glottis, a casualty which, I am persuaded, causes the destruction of many. Without prejudice to the art of swimming, I would have children exercise in household tanks from the tenderest age, in the act of paddling and treading water, so as to impart the confidence which unreasoning dread tends to lessen or take away, when one is suddenly immersed, in an unusual medium. The animal, the quadruped, begins to paddle at once when cast into water, but as man does not habitually employ the anterior limbs as organs of locomotion, reason must tell him that he may, if he pleases, employ them as organs of locomotion in the water, just as readily as any four-footed animal. To be sure a man has not the habit of using his hands and arms for locomotion, as the brute has, but otherwise how much more available is the paddle-shaped hand than a hoof or a paw. Again, the man, with little or no instruction, by throwing his head well back, can float and rest at pleasure, a thing of which the brute has no conception whatever.

Of course, a little preliminary habitude is desirable, but without any preliminary habitude or instruction whatever, there is nothing to hinder man, woman, and child, were they unable, in common parlance, to swim a stroke, from beating water with the hands and feet, just as the lower animals do, and so keep themselves afloat for a protracted period—a period that in a multitude of instances would be found sufficient to invite rescue and preserve life. The action of the feet down will sustain the body. The action of the hands down will do so; *à fortiori*, the action of both will prove yet more effective. I have tried myself; one alone or both together—nay, with a single hand only—in bygone years, I am sure, hundreds of times. There is no occasion for fuss or bustle. The body, taken as a whole, is actually lighter than water, bulk for bulk, and a very moderate amount of paddling with feet and hands will be found perfectly adequate to sustain and guide its movements. In fact, so long as the individual paddles, as I here direct, he cannot sink. A horse, or dog, or cow, or cat, or swine, when immersed in water, begins instantly to paddle, and that without any prior instruction or exercise whatever. Now, a man, or woman, or child has only to do as the inferior animal does, and he, she, or it will float necessarily and inevitably.

Those who are good swimmers will be able to indorse what has been said by Dr. MacCormac in the above extract. They are plain truths which ought to be generally known. If followed by those unexpectedly immersed beyond their depth, many lives would be saved. Yet even the simple rules taught are apt to be forgotten, or their practice neglected through fright or absence of mind in the hour of danger. The swimmer, conscious of his ability to assist himself, loses not his presence of mind, and hence, will be able all the more effectually to adopt, among other expedients which practice has taught him, and which, used alternately, serve to prevent fatigue, the paddling and treading system of Dr. MacCormac.

In connection with this subject, the following circular, issued by the State Board during the past Summer, may be properly inserted:

CIRCULAR OF THE STATE BOARD OF HEALTH, CALIFORNIA.

Resuscitation of the Drowned—Methods to be Adopted on the Spot.

RESUSCITATION OF THE DROWNED.

The season for deep-water, especially sea bathing, being at hand, the State Board of Health issue the following advice and directions, which may be profitably adopted in case of accident by drowning. They are simple, always available, require no delay, and can be effectually practiced by any intelligent person, until medical aid can be obtained. Many lives are annually lost by drowning through ignorance on the part of bystanders of the proper method of restoration, and many sacrificed by the use of inefficient and improper means. The plan of treatment proposed is the "Direct Method" suggested by Dr. Howard, and adopted by the New York Life Saving Institution.

RULES.

1. Instantly turn the patient downward, with a large firm roll of clothing under his stomach and chest. Place one of his wrists or arms under his forehead, so as to keep his mouth off the

ground. Press with all your weight, or with a force proportioned to the age of the patient, two or three times, for four or five seconds each time, upon the patient's back, below the shoulder-blades, so that the water may be pressed out of the lungs and stomach, and drained freely out of the mouth; as represented in the following cut (Fig. No. 1):

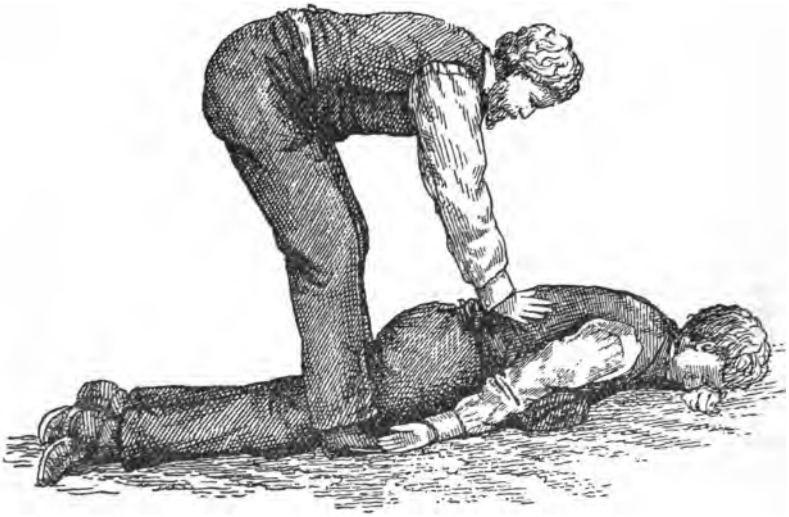

FIG. No. 1.

2. Quickly turn the patient face upward, with the roll of clothing under his back, just below the shoulder-blades, so as to make the head hang back as low as possible. Place the patient's hands above his head, where they may be secured by a handkerchief or cord. Kneel with the patient's hips between your knees, and fix your elbows firmly against your hips. Now, grasping the lower part of the patient's naked chest, squeeze his two sides together, pressing gradually forward with all your weight for about three seconds, until your face is nearly over the face of the patient, as shown in the following (Fig. No. 2):

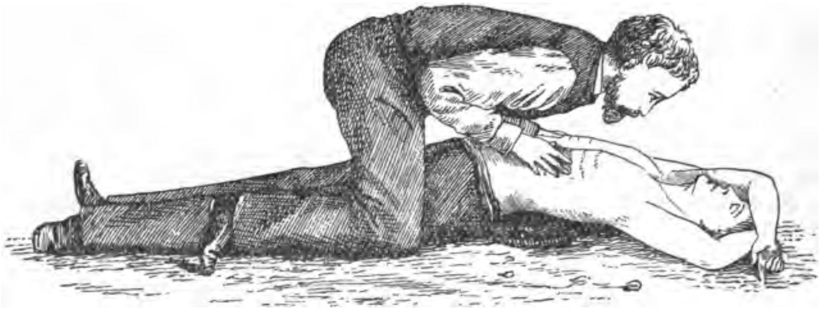

FIG. No. 2.

Then with a push, suddenly jerk yourself back (Fig. No. 3):

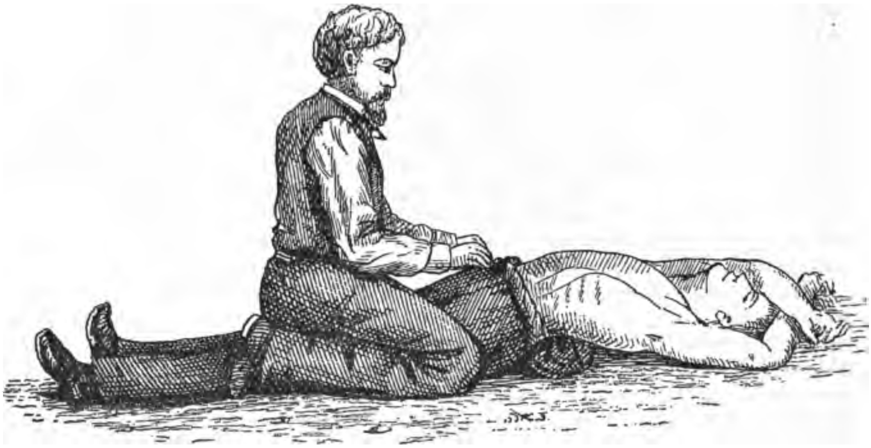

Fig. No. 3.

Rest about three seconds; then begin again (Fig. No. 2), repeating these bellows-blowing movements about eight or ten times a minute, for at least one hour, or until the patient breathes naturally. By these alternate movements, foul air is pressed out of the lungs and pure air drawn in.

Note.—The above directions must be used on the spot, the first instant the patient is taken from the water. Lose no time. A moment's delay, and success may be hopeless. Observe that neither apparent death, nor much delay in the appearance of the signs of life, afford just ground for despair. Perseverance is often rewarded by success, even after an apparently hopeless prolongation of insensibility.

Act promptly and steadily, following closely the rules given.

Prevent crowding around the patient. Fresh air is essential.

Should the patient commence to breathe, be careful not to interrupt the first short natural breaths. If they be long apart, carefully continue between them the bellows-blowing movements as before. (Figs. 2 and 3.)

After breathing is regular, let the patient be rubbed dry and wrapped in warm blankets.

As soon as the patient can certainly swallow, a little warm spirit and water may be given. This should be done cautiously, lest the patient may be choked.

After restoration, let the patient be kept quiet and sleep encouraged.

The above rules are intended for adoption in the case of adults. For younger persons, the force applied, as shown in Fig. No. 2, should be modified to suit the age, "the operator feeling his way as to how little or much he is doing, or may do, and regulating his course accordingly."

While on the subject of Santa Cruz, it is proper, even though it involve another digression, to refer briefly to the *sewerage* of the city.

The anomaly is presented of a city containing, according to the last census, about 4,000 permanent population, the resort, for four or five months in the year, of visitors, raising its Summer population to 5,000 or more, presenting in its location the most perfect facilities for sewerage, with the broad ocean by its side inviting its reception, yet relying, if we except the principal hotels, upon cesspools and privies.

There seems to be a conflict between the sanitary interests of the resident population and their pecuniary interests. An important part of the revenue of the city is dependent upon its reputation as a sanitarium—its excellent bathing facilities. The latter constitute one of its principal attractions, and a serious fear has been felt lest the system of drainage into the ocean would so pollute the water near the beach as to seriously interfere with this important interest.

There is doubtless some reason for the apprehension, unless due care is exercised in the construction of the sewers and in the selection and adjustment of the outfall. The discharge of a large quantity of solid sewage (excreta) into the bay, except under conditions which will insure its speedy removal before decomposition can take place, might have a fatal influence upon the fish, which constitute another source of revenue, besides supplying an important article of food. Fresh sewage is not hurtful to fishes, and is food for them; putrefying sewage is destructive, or drives them away. It is said, also, that admixture with salt water hastens the putrefactive process.

The serious question is how to get rid of the sewage so that it will neither float about the shore or be brought back again by the tide. Similar difficulties have arisen at most of the seaside watering places. They may, however, be generally overcome by a position of the outfall adapted to the tidal and other currents, the direction of the flow at all stages of the tide, the high Spring tides and the lowest ebb tides, and the effect of the prevailing winds. The direction of the tidal currents may be easily ascertained by a float—an ordinary champagne bottle, corked and ballasted with water, being a common and convenient expedient.

There is said to be an eddy tide in the Bay of Monterey, some distance out from shore, flowing northerly, possibly not too far distant to be taken advantage of.

An important consideration would be the rise and fall of the tide. It is said that the most difficult period of discharge for a sewer outlet occurs at the neap tides, when the tides do not rise so high or fall so low as at other times, and "as it is the lowness of the tide level that increases the efficiency of the outfall, so it will be found that if our outfalls are calculated to work efficiently at the period of the neap tides, we need not trouble ourselves about them at the period of Spring tides."

The prevailing wind may exert a considerable influence over the determination of a proper position for an outfall, where fresh sewage is discharged into the sea, consisting in part of floating fœcal, fatty, and other matters liable to be driven back to the shore.

A few of the difficulties to be encountered in the attempt to devise an entirely unobjectionable method of sewage discharge into the sea have thus been mentioned. Probably, none of them are insuperable, with even a moderate expenditure. The advantages to the health of the city, its reputation abroad, the increased comfort and convenience of its citizens, not less than of its many visitors, would more than repay the outlay. The enterprise and good taste of the people of Santa Cruz are evidenced by many tokens—its handsome buildings, its neat, shaded cottages, its excellent hotels, its pleasant drives. Only an efficient sewerage system is needed to insure its continued healthfulness.

There is said to a fall of ten feet from the head of Pacific Avenue to the bay near the outlet of the river—a distance of about one mile. There is also said, by those who ought to be familiar with the subject, to be a current just outside the point below the beach which runs northerly. These premises being correct, there should be no difficulty in the way of the successful application of engineering skill to the accomplishment of an object of such vital importance to the city. The point mentioned is below the town and the bathing grounds.

"It may be said in reference to sea outfalls," says Latham, "that owing to the great mass of water into which the sewage is ordinarily discharged, and also owing to the constant movement of the water, and to the action of the sea water itself in destroying organic matter, this mode of disposing of sewage is perfectly safe from a sanitary point of view, and every trace of sewage discharged under suitable conditions into the sea soon disappears. When we know by actual experience that the most perfect mode of dealing with sewage so as to purify it, will not remove over eighty per cent. of the impurities present, it is clear that if one volume of sewage were mixed with four volumes of water containing no sewage, the mixture would be equal in purity to the purest sewage effluent. In a sea outfall the proportionate admixture would be much greater, and is sufficient to produce the effects of purification observed under some of the most favorable conditions for securing a pure sewage effluent."

Southerly from Santa Cruz, across the bay, lies the old town of Monterey, once the Capital of California. The town of Monterey itself presents nothing inviting for the visitor, its chief attraction at present being the Hotel Del Monte and its beautiful surroundings. This hotel, situated in a natural park of live oaks and pines, has become one of the most fashionable resorts in California, and justly so. Built by the enterprise of the Southern Pacific Railroad Company, and supplied with all the appointments of a first class house, it presents a quiet yet elegant retreat for the citizen of the metropolis and of the interior, where to the pure fresh atmosphere of the seaside, the beautiful scenery, the pleasant drives, the opportunities for recreation and amusement, are added the social enjoyments of city life, happily associated with the comforts of home. Nature seems to have fitted this spot for just such uses, while the displays of art exhibited on every side, its well proportioned walks and floral adornments, have made it doubtless the most beautiful to be found in California. Its name, however, will probably be always associated with its advantages as a pleasant resort, where the mind, weary with the cares of business, may obtain rest, and the formalities of fashionable life in the cities may be exchanged for friendly intercourse, and the free, informal interchange of thought and social amenities.

Yet Monterey possesses many advantages in a sanitary point of view. Whatever benefits the sea air may afford may be found here, equally with other points on the coast. Though the beach is not much used for bathing purposes, the water being, it is said, some degrees colder in Summer than at Santa Cruz, it is provided, in connection with the hotel, with elegant arrangements for baths of every kind and of every desirable temperature. For many invalids warm indoor sea water baths are preferable to the cold bath in the open air. This is especially the case with feeble women and delicate children, with those suffering from rheumatism, and some forms of neuralgia. Some who are unable to bear cold baths at any time, may derive great benefit from these, and unless the temperature is much raised, as in the *hot bath, i. e.* exceeding 98° F., they are exempt from the dangers mentioned as incident to ordinary sea bathing, as, for example, in organic, cardiac, pulmonary, and cerebral affections. To the weary, nothing can be more refreshing—a fact well known and appreciated by the ancients. The opinion of the ancients, on this point, says Bell, was "expressed with sufficient clearness, in the fact of warm springs and baths being dedicated to Hercules, as indicative of their restorative and invigorating powers. No cold spring was dedicated to him. The warm bath is uniformly spoken of by Homer as a means of refreshing the wearied traveler, and of preparing him for the repast and the enjoyment of the other rites of hospitality—as we see in his account of the reception of Ulysses at the Court of King Alcinous, and in which the poet describes the luxurious enjoyment and the invigorating effects of the warm bath:

> The bath the King ascends;
> Where, happy as the gods that range the sky,
> He feasted every sense with every joy.
> He bathes: the damsels with officious toil,
> Shed sweets, shed unguents, in a shower of oil.
> Then o'er his limbs a gorgeous robe he spreads,
> And to the feast magnificently treads."

The principal meteorological features of Monterey are shown in the following table, prepared from observations taken at the gas works, at Del Monte, for 1880-81:

Months.	Means of Temperature.			Mean Max. and Minimum.			Cloudy or Foggy, in Days.			Rain.
	8 A. M.	1 P. M.	6 P. M.	Max.	Min.	Mean.	8 A. M.	2 P. M.	9 P. M.	
August, 1880.	59°.51	69°.58	61°.32	67°.00	61°.33	64°.85	25	3	12	------ -----
September, 1880.	57°.80	68°.73	58°.33	68°.66	58°.33	61°.60	25	1	19	------ -----
October, 1880.	50°.67	67°.64	56°.35	67°.66	55°.00	59°.55	10	3	10	1 day.
November, 1880.	45°.53	61°.80	48°.33	62°.33	40°.33	51°.13	6	6	4	3 d's, 6 in's.
December, 1880.	50°.41	57°.93	53°.29	58°.33	49°.53	53°.89	18	17	16	14 days.
January, 1881.	46°.48	59°.96	50°.35	62°.33	45°.00	52°.67	----	----	----	7 days.
February, 1881.	52°.82	61°.50	54°.53	62°.66	52°.00	56°.28	10	10	7	11 days.
March, 1881.	52°.83	62°.80	53°.79	66°.66	48°.00	62°.82	4	5	10	5 days.
April, 1881.	60°.60	67°.10	59°.10	68°.00	58°.00	62°.26	----	----	----	4 days.
May, 1881.	59°.74	69°.03	59°.38	68°.00	58°.00	62°.72	14	5	12	1 day.
June, 1881.	62°.10	71°.50	61°.83	68°.33	62°.66	64°.92	19	5	1	2 days, light.
July, 1881.	62°.64	74°.30	62°.81	72°.62	63°.33	66°.42	8	2	9	---- -------

The above table shows an agreeable equability of temperature—not too cold in Winter nor too warm in Summer; just such a temperature during the Summer months as would be acceptable as a *change* to the residents of the heated valleys of the interior. The table of "cloudy and foggy" days represents the days when there was *more or less* cloud or fog visible. Thus, for the 314 days included in that portion of the table, there were more or less clouds or fogs at 8 A. M., 130 days; at 2 P. M., 57 days; at 9 P. M., 101 days. Fogs or mists often appear early in the morning, but are commonly soon dissipated, and similar mists are not infrequently observed in the evening. There were thirty-seven days upon which some rain fell.

Through the kindness of one of the visitors at the Del Monte, the following record is obtained of the weather during forty-three days, commencing with June 17th of the present year. Seventeen days were more or less foggy at 7 A. M.. On twenty-eight days the sun was visible, without fog, at the same hour. Twenty-three days were bright and sunny all day. On four days it was clear until after noon, when a light fog appeared. On one day (June 30) it was clear during the morning, with a thunderstorm at 2 P. M. Usually the early morning fog would disappear from 9 to 11 o'clock A. M.

One and a half miles from Monterey we find the "Pacific Grove Retreat," much frequented during the Summer season by families and others from the heated plains of the interior, desiring to avail themselves of the sea air and sea bathing, together with the advantages of a quiet, home-like retreat, free from the excitement and gayety commonly attendant upon the more fashionable seaside resorts. It is pleasantly and favorably located on the beach, which is said to be well adapted for bathing purposes, in a grove of pines whose aroma is agreeably mingled with the vapors of the sea. The grove is conveniently laid out in lots upon which tents or cottages may be erected, in which parties for the season may, if they prefer, enjoy all the pleasures of home. A church has been built upon the grounds, in which services are usually held on Sunday.

The climate partakes of the general character of the locality of Monterey, though modified somewhat by the pines, which afford partial shelter from the winds. I apprehend for this delightful place sanitary defects similar to those hereafter to be spoken of in connection with Camp Capitola, near Soquel, and other localities of popular resort—evils incident to the gathering of many individuals within a limited area for successive months during a number of years. The danger here is less prominent, however, in consequence of the larger area inclosed, and its greater slope towards the sea; also, in consequence of a partial drainage, which has already been undertaken. The cesspool system might and should be abolished here.

Aptos and Camp Capitola are other points on the bay which have become the resort of visitors for health and pleasure. They are within a few miles of Santa Cruz, and possess the general climatic features belonging to the latter. Camp Capitola is a camping ground near the beach, sheltered by projecting points on the coast, and, therefore, less exposed to severe winds. It is said to have an excellent beach for bathing, and it affords superior facilities for those interested in the healthful and exciting amusement of fishing. Its arrangements as a camping-ground, to be much frequented during the Summer months, might be greatly improved, especially for the convenience of females. In fact, to this and some other camping-grounds, annually occupied by visitors, the same strictures, from a hygienic standpoint, apply. Too little attention is paid to their sanitary condition—to drainage, to the disposition of sewage, and to cleanliness. At Camp Capitola, for example, the ground used is a flat just above the sea level, unsuited to good drainage, and with successive years of occupation, must become foul, saturated with organic filth, its atmosphere tainted, and productive of low fevers.

Two hundred and eight miles from San Francisco we reach Santa Barbara, known as being one of our most popular places of resort for the invalid. Its reputation is based rather upon its climatic advantages as a sanitarium for invalids than upon those which pertain to a seaside watering place, though for the latter it is well adapted. It is peculiarly suited for a Winter residence for the consumptive when not too far advanced in disease, and, as such, has been much frequented, not only by the citizens of the Pacific States, but by those from the Atlantic border, eager to exchange the cold, inclement climate of the East for the dry, genial atmosphere, the equable temperature, the mild breezes, so well suited to their condition.

The following table, heretofore published by the State Board of Health, will serve to illustrate some of its more important climatic features:

MEAN TEMPERATURE AND HUMIDITY AT SANTA BARBARA.

Reported by Dr. L. M. Dimmick.

Day of Month	1876.																		1877.	
	April.		May.		June.		July.		Aug.		Sept.		Oct.		Nov.		Dec.		Jan.	
	Mean Daily Temperature	Mean Daily Humidity	Mean Daily Temperature	Mean Daily Humidity	Mean Daily Temperature	Mean Daily Humidity	Mean Daily Temperature	Mean Daily Humidity	Mean Daily Temperature	Mean Daily Humidity	Mean Daily Temperature	Mean Daily Humidity	Mean Daily Temperature	Mean Daily Humidity	Mean Daily Temperature	Mean Daily Humidity	Mean Daily Temperature	Mean Daily Humidity	Mean Daily Temperature	Mean Daily Humidity
1	56	62	66	66	59	66	68	73	72	80	68	71	73	63	57	60	58	44	59	64
2	57	81	67	57	62	70	66	75	72	78	68	68	69	79	55	63	58	61	53	55
3	53	74	64	51	61	75	66	81	70	71	61	71	68	78	56	71	58	61	59	53
4	59	77	59	62	66	74	66	78	66	76	67	70	66	82	57	74	55	58	56	48
5	51	76	62	73	63	80	67	75	66	77	66	70	65	84	60	72	61	45	62	44
6	57	77	65	63	62	68	68	77	67	76	64	70	66	81	61	67	59	46	48	73
7	54	72	63	73	65	89	69	77	68	71	64	72	68	83	66	51	57	51	58	84
8	51	58	64	67	65	68	65	65	71	71	65	74	67	79	64	56	55	61	56	83
9	58	55	59	76	65	64	70	66	70	73	69	72	65	80	64	74	56	68	57	77
10	54	49	61	73	65	68	72	62	69	73	67	72	65	86	62	75	54	66	55	84
11	54	36	58	78	68	63	72	71	70	73	68	74	65	79	59	72	58	63	54	64
12	62	51	60	71	62	72	67	80	68	73	67	77	63	80	60	63	57	75	49	63
13	59	55	60	57	68	75	68	74	66	72	69	76	63	77	57	51	55	82	45	60
14	60	55	60	66	66	74	68	74	66	71	69	78	62	82	58	47	53	77	51	54
15	65	57	62	62	65	78	69	69	69	71	66	73	66	80	57	66	53	66	54	40
16	71	58	60	60	69	72	68	69	69	69	65	79	65	80	58	74	54	57	51	70
17	62	72	62	44	69	74	66	76	68	71	66	75	67	84	64	82	51	62	54	85
18	59	71	64	57	67	75	65	68	65	73	66	78	67	74	60	78	57	67	54	84
19	59	69	63	59	65	77	68	77	67	70	64	82	68	76	58	80	56	68	56	77
20	59	69	64	56	68	70	68	72	66	64	68	85	71	78	57	86	59	70	54	82
21	58	76	63	51	68	69	72	79	65	66	63	85	71	82	61	66	52	76	57	85
22	59	77	65	62	69	68	73	78	66	73	63	77	69	72	58	54	54	73	56	78
23	57	66	64	66	67	76	72	85	67	75	63	82	67	62	56	55	55	56	57	70
24	61	67	68	67	66	79	73	74	65	78	79	79	64	64	58	53	51	70	57	89
25	62	71	67	60	68	79	73	72	65	79	85	87	60	73	62	60	52	66	54	72
26	66	70	70	70	68	80	70	73	64	75	71	83	62	73	69	46	52	79	53	68
27	74	53	66	61	68	75	69	76	64	75	68	81	65	75	64	53	55	73	57	80
28	77	53	62	73	67	77	69	76	63	74	67	81	62	67	58	75	54	79	58	84
29	72	58	64	68	68	77	71	74	63	67	69	80	61	60	56	75	54	78	57	80
30	62	64	67	54	69	75	71	79	66	68	73	75	63	60	57	56	53	81	57	81
31	--	--	63	63	--	--	70	77	66	68	--	--	60	65	--	--	55	68	58	76

The dryness of the atmosphere, notwithstanding the location of Santa Barbara on the coast, is an important factor of the climate of the place. Taking the six months, from April to September inclusive, we find the mean humidity for April to have been 64.3; May, 62.74; June, 79.53; July, 69.1; August, 72.61; September, 73.23, or a mean of 70.25; while for October, November, December, and January, it is 64.77, 65.16, 65.39, and 70.25 respectively, giving a mean for what are considered to be rainy months, of 66.39 per cent, even less than during the Spring and Summer months.

The reputation of Santa Barbara as a residence for the consumptive, is not confined to California or to the United States; it has spread to Europe, whence a number of invalids have been sent, even during the past year, by eminent medical gentlemen, for the purpose of securing the great sanitary advantages the locality affords. It is during the early stages of disease that the full benefits of a residence here are to be experienced, and if physicians would only bear this important fact in mind, when advising the afflicted to spend the season here, Santa Barbara would soon take rank among the best of the sanitary resorts of the world. This place, taken in connection with the Ojai Valley, not far distant, and which offers all the advantages to be derived from elevation, a pure bracing mountain air, beautiful scenery, and opportunities for healthful pastime and exercise, may justly be said to present sanitary advantages of the highest order for the greater portion of the year. The one is, to a great extent, supplementary of the other, each reciprocally contributing to make up a climate admirably adapted to become the home of the consumptive in that stage of the disease capable of being improved by climatic agency.

Seventy-three miles from Santa Barbara brings the traveler to Santa Monica, a popular resort of the people of Los Angeles and the southern portion of the State, and at one time considered destined to become the "Long Branch" of the Pacific. It has several advantages as a watering place. The climate is excellent, modified by the protection it receives from the prevailing winds by Point Duma and by the islands on the west and south. The beach is considered by those accustomed to bathe there as being better adapted for the purpose than any other along the coast—smooth, hard, and gently sloping—while the water is some degrees warmer than at Santa Cruz and Monterey. There is said to be no undertow. The following table of the temperature of the air and water, furnished to the State Board of Health by the former agent of the Santa Monica Land Company, will be interesting as showing a marked contrast with the figures given for the same months at Santa Cruz:

Air ------June, 68°; July, 68°.0; August, 65°.5; September, 65°.2.
Water----June, 69°; July, 69°.5; August, 68°.0; September, 65°.5.

These temperatures closely accord with those considered by Braun to be desirable for bathing. There is a special cause for the greater temperature of the water at Santa Monica, it being the warm ocean current from the southeast which, according to Professor Davidson, courses westwardly along the coast, two or three miles in width. This current is felt even at Santa Barbara. There appears, from the observations at hand, that there is a gradual increase in the ocean temperature as we go southerly from San Francisco. The temperature of the water at the Golden Gate (San Francisco) is given at 56°; at Santa Cruz we have seen it to be, for the Summer months, 59°.7; at Santa Barbara it is 62°, and at Santa Monica 68°.

Fine bath houses have been provided at Santa Monica, for those unwilling or unable to enter the surf, and excellent arrangements made for plunge and swimming baths. Its inaccessibility and its distance from San Francisco have, however, prevented its becoming the popular resort it would otherwise have been, or which was at one time anticipated for it. At the present time it is reached only by railroad from Los Angeles.

San Diego, the last of the localities on the coast proposed to be considered, is 482 miles, by ocean, from San Francisco. The direct and most pleasant route is by steamer from San Francisco, although the California Southern Railroad is now completed to Colton and affords continuous land communication. San Diego contains a population of 3,000 to 3,500 inhabitants, and has the advantage of one of the best harbors on the coast. The town is pleasantly located, rising gradually from the bay to the higher *mesa* land, and possesses a climate distinguished for the mildness of its Winter temperature, its equability at all seasons, and, as compared with other coast cities, its exemption from severe winds.

Some of the meteorological features of the place may be learned from the following table, prepared from observations taken at the United States Signal Service station in that city by Sergeant C. E. Howgate:

MONTHS.	Mean.	Max.	Min.	MONTHS.	Mean.	Max.	Min.
January, 1876	51°.2	52°.3	44°.8	July, 1876	68°.6	74°.0	63°.5
February, 1876	55°.3	63°.6	48°.4	August, 1876	69°.1	74°.4	64°.6
March, 1876	54°.8	60°.4	47°.0	September, 1876	65°.9	71°.2	61°.0
April, 1876	59°.3	67°.6	51°.7	October, 1876	64°.2	70°.5	59°.3
May, 1876	61°.5	67°.4	55°.4	November, 1876	58°.9	69°.2	50°.7
June, 1876	65°.4	70°.9	61°.0	December, 1876	56°.5	66°.4	49°.1

The climatic advantages, as concerns temperature, are apparent. Between the three months of Winter, December, January, and February, and four months of Summer, June, July, August and September, there are only 12°.8 difference in the mean temperature, 11°.5 in the maxima, and 15°.2 in the minima. The minimum temperature of August, the hottest month in the year, is only 19°.8 higher than that of January, the coldest month. The mean relative humidity for the Winter of the same year is suggestive of one of the striking features of the place—69°.9 per cent.—less than for the four Summer months, which gave 76°.4 per cent. A similar condition of atmospheric humidity was alluded to as noticable at Santa Barbara.

Through the kindness of Sergeant Barwick, of the Signal Service in Sacramento, I am enabled to give the subjoined statement of the "cloudy" and "foggy" days during 1880, corresponding in time to the observations previously given for Santa Cruz and Monterey:

MONTHS.	Cloudy days.	Foggy days.	MONTHS.	Cloudy days.	Foggy days.	MONTHS.	Cloudy days.	Foggy days.
January	5	------	May	15	2	September	9	------
February	5	------	June	10	------	October	15	4
March	10	------	July	17	------	November	3	1
April	11	------	August	11	------	December	9	------

The almost entire absence of fog is an important feature, and constitutes one of the principal advantages which San Diego possesses over other points on the coast. When it does arise, it is, commonly, for only a few hours in the early morning.

Probably no locality in California presents conditions more favorable for very many of those seeking a Winter residence in the early stages of consumption than San Diego. The atmosphere, when we regard the entire year, lacks the dryness, which, according to the prevailing opinion of the profession, constitutes so important a consideration in this disease, yet, it is undoubtedly true that, in many cases, the sea air, although humid, is not only not objectionable but positively beneficial. The particular class of cases belonging to this category it is not the purpose of the present paper to inquire. Those with whom the low land of the locality and the sea air do not seem to agree, may find in the Coast Range mountains, a short distance in the interior, the greater elevation, the lighter and more bracing atmosphere, and the lower relative humidity which they require, without the excessive rainfall and the low temperatures of more northern mountain resorts. Many cases do well in San Diego during the Summer months, and its agreeable temperature, its comparative exemption from fogs, seem to be productive of permanent benefit. Not a few who went there as invalids, and in whom the diagnosis of phthisis had been made by competent authority, have permanently remained, with the result of apparent restoration. In conversing with the citizens of this place, it is an every day occurrence to meet with such cases—men, now, as far as external signs can indicate, in perfect health. Indeed, permanent residence is considered by the physicians of the place to be almost indispensable to the full benefit capable of being derived from the climate.

It has been said that the ocean winds which prevail to a greater or less extent all along the coast, are, in consequence of local causes, less felt at San Diego than at most other points. This is particularly true of "Old Town," which is sheltered by location from the winds from either quarter.

IRRIGATION AND DRAINAGE.

By J. P. Widney, M.D., Member of the State Board of Health.

It is now a full century since the use of water for the irrigation of agricultural lands was commenced in Southern California. The ruins of each of the old Missions has, among its notable features, a system of dams and irrigating ditches, or zanjas, leading to orchards and vineyards, many of which still yield their yearly fruits. The area of land brought under cultivation, however, was then so limited in comparison with the great stretch of open country, and the sites of these Missions had been chosen with such careful regard to natural salubrity of situation, that the question of any unhealthfulness attending irrigation was never raised. With the great influx of population, however, during the last fifteen years, the area of land brought under the various systems of irrigation, has been, and is still, so rapidly increasing that the sanitary question becomes a very important one. It is also an especially interesting one to the physician or sanitarian, as there seems to be an apparent lack of regularity in the action of certain well established laws, and irrigation has, in some localities, been attended by a marked development of malaria, while in other localities no such results seems to have followed. There must be a reason for this—an underlying cause. That cause can best be discovered by a comparison of these different localities and their peculiarities.

The lands now under irrigation may be roughly divided into four general classes:

First.—Uplands, of which San Gabriel, Pomona, and Riverside may be taken as types. These lands have a firm soil, rather a gravelly clay, which remains moist, but not water soaked, after irrigation; the slope of the country is regular, and sufficiently rapid to prevent water from standing upon the surface; they lie in what is really the great interior valley of Southern California, corresponding to the Sacramento-San Joaquin Valley of the northern portion of the State; have consequently less force of the ocean winds than the other three classes to be mentioned; have a decidedly higher Summer temperature, and are planted chiefly with trees and vines.

Second.—River bottoms of sand or alluvium, as those of the Los Angeles and lower Santa Ana, lying outside of the ranges which shut off in part the wind from class No. 1. The lands of this second class have the full force of the sea breeze, broken somewhat by the orchards and rows of trees which line the roads. There is a fair slope, so that water does not remain in pools upon the ground; and under the alluvial surface soil a substratum of coarse gravel, many feet deep, making under-drainage thorough and complete. Lands planted in trees, vines, corn, and barley.

Third.—The sandy bottoms of the San Gabriel River, of much the same character as No. 2, but with a much less rapid surface slope; a wider and more tortuous river bed, with willow thickets and still water, and the under stratum of water standing much nearer the surface soil. The under-drainage in this valley is much less thorough than in the Los Angeles and lower Santa Ana. Lands planted largely in trees and corn. Sea breeze the same as in No. 2.

Fourth.—Cienaga lands, as in the belt which reaches from the Ballona to the lower Santa Ana, a length of some forty miles, with a width of from three to five miles. These lands are open plain, near the sea, swept by the full force of the daily sea breeze; have a heavy soil, of the adobe type; occasional springs and bogs, with natural ponds of water; in Winter become very wet; in Summer are irrigated extensively by means of artesian wells, the water from these wells often standing in pools upon the surface and draining off slowly in sluggish ditches, choked by weeds, while the heavy adobe soil gives no under-drainage. These lands are somewhat inclined to be alkaline. Trees are not extensively planted, the land being chiefly in small grain and grass or alfalfa. It is a dairy country.

In tracing the development of malaria through these four classes, it is found that the lands of the first class are almost entirely free from even the slightest trace of its existence.

The lands of the second class show its existence, but not to a sufficient degree to form a marked feature in the endemic causes of disease, except in a few limited areas, which will be again mentioned.

The lands of the third class show the presence of malaria in a notably active form, giving a well marked type to the Summer diseases.

The lands of the fourth class develop, with irrigation, a very active form of malaria, the diseases being largely of a pronounced malarial type, and running often a severe course.

These results do not, at first sight, seem altogether such as we might naturally expect. Class one, farthest from the sea, with the force of the daily sea breeze shut off by ranges of intervening hills, planted very extensively with trees, and having a higher Summer temperature, develops, with irrigation, practically no malaria; while class four, out upon the open plain, only a few miles from the sea, with no intervening hills, planted only to a slight extent with trees, swept daily by the full force of the sea breeze, and with the lowest Summer temperature of all, shows the greatest prevalence of malaria, and in the most virulent form.

There must be a reason for this. What is it?

Upon following the comparison carefully, it will be found that the only feature which bears a constant relationship to the development of malaria is drainage. Class 1, with every other cause at work to produce malaria, greater distance from the ocean, less sea breeze, higher Summer temperature, is thoroughly drained both above and below the surface, and has, practically, no malaria. The only place in this belt where I have, in my own practice, ever found traces of it, is one spot under the lee of a hill, where, by the side of a pond, the drainage is bad and the soil water-soaked.

In class No. 2, the only decidedly malarious district I have found, is a region of river bottom extending from the upper edge of Los Angeles City for a few miles on up the river, where the channel widens out and the water runs amid willow thickets, with much wet, boggy meadow land. Further down the river, as the under-drainage becomes more thorough, the evidences of malaria grow less and disappear, although in the midst of orchards, vineyards, and grain fields, where the land is irrigated many times during the Summer. The Santa Ana lands I know less about, but so far as I can learn, they follow the same general law.

In class 3, the same as class 2, except the wide river bed, the water-soaked, reedy bottoms, and the less thorough under-drainage, malaria begins to show itself actively. These lands resemble more the ill-drained section of the Los Angeles Valley, which I have described.

In class 4, the lands which, by nearly all the known laws governing the development of malaria, except the one thing, bad surface and under-drainage, should escape, we find malaria more prevalent and active than in either of the others.

The conclusion seems to be fairly just and legitimate, then, in the absence of any other apparent cause, and from what we know of the close connection between defective drainage and malaria, that, in this case, the relationship is that of cause and effect. With thorough drainage, the places which, by all other rules, should develop malaria, escape it almost entirely; without drainage, the places which, by all other rules, should be free from it, develop it constantly and actively.

The whole history of irrigation in southern California goes to impress this lesson: that, to escape malaria, drainage must go hand in hand with irrigation; that unless it does, the water which brings wealth brings also disease and death.

The cienaga lands of Los Angeles could easily be drained by a few large, deep canals, with lateral ditches, but as yet, it has seemed impossible to get the people who are the chief sufferers to unite in carrying out the work.

It is probable, that in the great interior valley of the Sacramento-San Joaquin, entirely away from all sea breeze, and with a Summer temperature much higher than in Southern California, the exemption from malaria, even with thorough drainage, would not be so complete, yet in the light of the foregoing facts it is safe to say that such drainage would unquestionably render the poison much less active.

Apart from any question of health, drainage is the solution to another difficulty—alkali. Thorough drainage, with irrigation, will leach out the soil and reclaim it, while without drainage the experience of irrigators is, that alkali increases, until eventually the lands become entirely worthless.

SHOULD THE STATE ESTABLISH AN ASYLUM FOR INEBRIATES?

By C. W. Breyfogle, A.M., M.D., Member of the State Board of Health.

While governmental law and supervision is for the good of all, it is so in two ways. First, for the purpose of protecting the law-abiding and peaceable citizen and the one who is able to care for himself and family from the assaults of, and from association with, the citizen who contemns the law, whose life is subversive of order, and whose condition, mentally or physically, may be such as to prevent him from caring for himself or family. Secondly, to provide a secure place for the retention of those who are an injury to society, and for the aid of those who are unable to care for themselves. To this end has the State established its prisons, asylums, and hospitals, and the charge and maintenance thereof are properly provided for by taxes upon the whole of its people. The propriety of such a course is never questioned, but the people accept the burden without objection as a most necessary one for the public safety and welfare. Intemperance is unquestionably our greatest social evil. Poverty, crime, debauchery, and consequent diseased degeneracy, are but its assured and legitimate offspring. While the State provides an asylum for the insane and a prison for the criminal, it is guilty of the fallacy of allowing free license to him, who, by his intemperance, is the chief author of such insanity or criminality. Health officers and physicians are unceasing in their efforts to prevent disease, yet allow its germs to be sold at every street corner. While there is not a citizen but knows that his taxes are vastly increased and his life and property placed in greater jeopardy by the intemperance everywhere to be encountered, yet he hesitates to rebuke it by word or vote.

The physical effects of alcohol are too apparent and too well known for me to endeavor to explain them within the scope of a brief paper. I simply wish to call attention to the fact that there is wisdom and sound economy in attacking an evil in its incipiency rather than when its effects are fully developed and already spread to the damage of a family, or, mayhap, a whole community. But, if the State will not provide such measures as will insure its people against the creation of inebriates, the duty then plainly devolves upon it of providing for them when made. Nor need I attempt to argue the question of the inability of some to refrain from the evil of drink, just as others are drawn into the commission of crime through hereditary mental feebleness, or through the force of evil influences which they are too weak to resist. The facts remain—the dipsomaniac is in a diseased physical condition, and this diseased physical condition adds to his diseased mind and morals, and he is wholly irresponsible as to self-care, and as justly entitled to the care of the State as is the criminal or the insane. I conclude that the

State should, therefore, provide an asylum for this class. The duty is apparent; the practicability unquestioned, having already been proven in other States; and the good results will be manifest in the check it will be to many; in the removal of dipsomaniacs from local hospitals where no systematic effort can be made toward their reform; in the removal of some, who, by their very presence in a small community, familiarize the young with vice and furnish an immoral element which has its evil influence upon all; and lastly, and by far the most important, in the prospect of reform, of making good citizens out of the heretofore bad—a reform which is practical, already demonstrated successfully, and by far outweighing in its results all consideration of expense.

In a properly managed Inebriate Asylum, reform should be the rule, not the exception. While questions of management must be founded upon the experience furnished by previous efforts, yet is one point of that management already fully proven, namely, that no reform can be permanent that is not based upon the principle that the treatment of the inebriate must be such as to familiarize him with his enemy. He must learn to resist the temptation of its immediate presence, else this temptation will at once overcome him upon his release from the institution. All efforts at reform which forbid the patient a sight, smell, or taste of alcohol while within the walls of the asylum, are useless. In this reformatory effort I take it to be granted, that, so far as possible, and it is possible in the great majority of cases, advantage would be taken of the conscientious desire for relief which may be denominated the moral phase of the patient's condition. With this desire to be freed from the vice that has enslaved him, with the surroundings of a pleasant home and proper hygienic treatment, and with careful medicinal treatment for the restoration of his physical system from the poisonous effects of the alcohol he has taken, as well as for the control of his appetite (for in this too the physician's art is highly potent), there is no reason why success should not crown the effort, and many good citizens be saved to the State, to society, and to their families.

We wonder at the harsh measures formerly in vogue for the treatment of the insane. Let us not forget that like harshness is still more misplaced in the reformatory treatment of the dipsomaniac. A gentle sympathy, united with conscientious desire for his patient's welfare, is the best remedy in the physician's pharmacopœia. The patient's improved physical condition, from proper medication and diet, will render him more susceptible to the elevating influences of kindness and improved surroundings, reform will be more desirable to him, and his moral and physical natures will be aroused to more strenuous exertions toward overcoming his evil habit, and he will thus be fortified against and made able to resist the immediate presence of his tempter, even to have it upon his person or in his room. Such a course dismisses the patient reformed. Abstinence from the temptation does not reform, else would our prison accomplish this end. On the contrary, we find the criminal made a criminal by intemperance, incarcerated for years, with no sight of alcohol, and apparently no desire for it. He is released, and the first opportunity to indulge is seized, and all his long abstinence goes for naught. Money expended in the creation of an asylum having for its basis incarceration and forced abstinence, will simply provide "a good place to sober off in." To conclude:

First—The establishment of an asylum for the treatment and reformation of inebriates is demanded as a matter of State polity; for the good of all classes of its citizens.

Second—Such an asylum must be based upon the assumption that inebriacy is an acknowledged disease, amenable to treatment.

Third—Reform, thorough and complete, must be aimed at, by throwing the patient upon his own resources as to recuperation, by giving him the kindest care and proper mental and physical occupation, by the influences of a carefully selected diet, by ample exercise, by pleasant surroundings, and by combating every physical disorder by prompt and appropriate medication.

Fourth—He must be exposed to temptation, until, by familiarity, the presence of alcohol excites no desire for its use.

Fifth—He should constantly be made to understand that the whole aim of the institution is to assist him in his efforts to reform, and he should be held accountable for his conduct to this relation alone.

THE ANIMAL FOOD WE EAT,

AND THE MEANS WHICH SHOULD BE ADOPTED TO PREVENT THE SALE OF UNWHOLESOME MEATS.

By W. R. Cluness, A. M., M. D., Member of the State Board of Health.

It is not our intention to treat the subject of this paper in anything like an exhaustive manner, but rather to comment briefly upon some points in connection therewith which, it is believed, are not generally understood, but which are of vital importance to the health of the community. From a humanitarian standpoint so many interesting suggestions might be offered which ultimately involve the health and happiness of mankind that we are almost persuaded to dwell upon them; or we might even attempt to disprove the too commonly accepted notion that our food animals were created altogether for the use of man and not for their own enjoyment. Such a consideration would, however, be foreign to our purpose; nor, indeed, is it of much practical importance to the public to determine anything regarding the subject beyond the fact that the flesh of the animal be wholesome when prepared for consumption. For the present, therefore, we propose confining ourselves to a brief consideration of animal food and its effects upon the system when eaten in an unwholesome condition; to some of the means which should be adopted by grazers for the purpose of raising healthy cattle; their transportation to market; the manner in which they should be slaughtered, and the surveillance which should be adopted to prevent the sale of diseased meats of all kinds. And when we reflect how largely animal food enters into the *necessities* of the public it will be readily understood how important it becomes that it should be not only wholesome when eaten, but of the best obtainable quality as well. We have somewhere read that there are at least one hundred millions of animals of all kinds slaughtered annually in this country for food, making about two animals for each man, woman and child in our whole territory; and when it is known that it is susceptible of proof that nearly, if not fully, one fourth of this vast multitude of animals is actually diseased before being slaughtered, and an equal amount of the flesh becomes diseased and consequently unfit for food before it reaches the consumers, after it leaves the abattoirs, some idea of the amount of sickness resulting therefrom, and one of the greatest causes of our mortality will be more readily comprehended. Especially is this true and demonstrable during our summer months, when animal food of all kinds is more liable to decay and become unfit for consumption. To the physician the deleterious effects of unwholesome animal food when taken into the stomach are of almost daily observation, for many of the cases of gastralgia, gastritis, dyspepsia, diarrhea, and other forms of derangement and disease of the alimentary canal, which he is called upon to treat can be traced directly to the eating of a diseased oyster or an unwholesome piece of meat.

THE RAISING OF CATTLE FOR THE MARKET.

So far as the raising of cattle concerns the consumers thereof, but little objection can be offered, for in a country like ours (referring more especially to Idaho, Montana, Utah, Oregon, Washington Territory, Arizona, New Mexico, and Texas), in which much of the land required for grazing purposes can either be purchased cheaply, or occupied without purchase, and in which the Winters are not so long or severe as in our Eastern and New England States, and where such vast ranges are obtainable, the opportunities and advantages offered for the production of quality as well as quantity, can nowhere be excelled. And it is gratifying to know that our cattle raisers are learning to form a just appreciation of the importance of propagating from the best stock, and those only that are healthy. When they learn, moreover, that inferior animals, and especially those used for consumption as food, are subject to many of the diseases with which man is afflicted, acquired as well as hereditary, and that these diseases are communicable to those who partake of the flesh of animals thus diseased, it is believed they will not be slow to take advantage of the knowledge thereof for their own benefit, as well as for the protection of the health of the consumers of their products. A more thorough knowledge of the importance of this subject will doubtless become apparent as our grazers acquire knowledge and experience, and in proportion as the range obtainable becomes diminished, and the amount required for consumption increases. Where one animal is now required, two or more will soon be needed, and from territory largely decreased by a rapidly increasing agricultural population. Sufficient, however, for the day is the evil thereof. For the present, and in the sections of country referred to, an abundance of the richest and most juicy grasses is usually found at all seasons of the year, and the country is generally well watered, and sufficiently protected by shade trees to prevent the cattle from becoming overheated by the sun—considerations which the intelligent grazier has learned to appreciate as being of the first importance in raising healthy animals. In addition to these important factors, experience conclusively proves, that in proportion to the thoroughness of the breeding and the care bestowed in nurturing and maturing the animal to the fullest possible extent, from its earliest infancy up to the time it is ready for the market, so will be the quality of the flesh for food. Even the manner of herding and driving the animals to market materially influences the quality of the flesh; for when driven hastily, and goaded by men, and chased by dogs, the anger, fear, and excitement incident thereto affect injuriously the flesh of the animals, and render it unfit for food, and positively dangerous to the consumer. Many examples are recorded of the injurious effects of the flesh of animals thus driven to market and overheated, protracted illness, or even sudden death, resulting.

TRANSPORTATION OF ANIMALS TO MARKET.

It is a matter of observation that many car loads of cattle, hogs, sheep and calves are transported almost daily over our railroads from the interior of our State, as well as from the neighboring States and Territories, to our cities for consumption, and that those animals thus transported are conveyed in cars, each one of which contains as many animals as can, by any possibility, be crowded into it. Each car is thirty feet in length and consists of but one compartment. The animals, as stated, are so crowded together that it is impossible for any of them to lie down and rest without being trampled upon and injured to such an extent as to render their flesh wholly unfit for consumption, or are thus killed outright. The law governing their transportation requires that they shall be removed from the cars once every twenty-eight hours, for the period of five hours, at least, for rest, food and water. In this manner are the cattle, intended for consumption, transported over our railroads, frequently for several hundred miles without food or water, and, from information obtained from the owners of cattle, as well as from butchers and others, it is ascertained that animals not infrequently die during transit from natural causes or from disease, or are trampled to death by those that are more healthy and vigorous. And it is further ascertained from the same authorities that these animals are not cast away and buried as being wholly unfit for any purpose, but not infrequently find their way into our market stalls, where they are, of course, sold to customers. And so adroit have butchers become in dressing and preparing such carcasses for sale that even their fellow experts are unable to distinguish them from those that are slaughtered. Even hogs that die during transportation, or by the wayside, from becoming over-heated and from fatigue, or even disease, are not allowed to waste, but are tried into lard, which, of course, finds its way into our biscuits, cakes, pies, and other articles of daily consumption. Not even the bruised and battered pieces of flesh, which are cut by the butchers from the carcasses of animals injured during transportation, are thrown away, but "are sold and converted," said a gentleman in authority to us, "into canned meat." We forbear making further comment upon this part of our subject, although many particulars of a like repulsive character are in our possession which might be detailed *ad nauseam.*

Who, in view of these facts, will gainsay the opinion of the late Dr. Derby, Secretary of the Massachusetts State Board of Health, "that the transportation of animals in this country, at the present, is, in main, barbarous and infernal." And this was said about ten years ago, when the same method of transportation existed, and even to the present is largely adopted in the Eastern States, and which now prevails in this. But that a better, more humane, and more profitable method of transporting animals to market can readily be adopted, has not been doubted for many years, the only surprise being that it has not been universally used or enforced by legislative enactment heretofore. Contrast the system referred to with that spoken of in the Scientific American of June 24th, where we read that "the improved cars are each forty feet long, inside measurement, or ten feet longer than the ordinary cattle cars. Each car contains sixteen stalls, eight of which face to one side and eight to the other. These stalls are two and a half feet in width and eight and a half in length, and seven and a half in height, allowing ample room for the largest steer to lie down on and rise from his comfortable dried sand bed of an inch and a half in thickness. They are separated by gates, which are cushioned, with spring fastenings, against which the animals can lean without being bruised by the motion of the train. * * * In front of the animals, along the sides of the cars, are continuous troughs, for feed and water. The cattle are watered at stations along the road, and at the same time supplied with hay, to be eaten while the train is in motion." And we are informed in the same article that instead of losing from seventy to one hundred pounds each, in weight, as formerly, during transit from Chicago to New York, the average shrinkage was but twenty pounds; and, instead of traveling at the rate of from eight to twelve miles per hour, the average speed in this State, the speed of these cars, between Buffalo and New York, was from thirty to forty-five miles per hour.

We believe, with Mr. Angell, President of the Massachusetts Society for the Prevention of Cruelty to Animals, that when these cars come into general use railroads will make more money, because one third to one half more cars will be required to transport the same number of cattle; dealers will make more money, because (say nothing of animals that die on the passage) an enormous waste of the best parts of the meat will be saved, and this saving will not only pay the increased charges of transportation, but also leave an immense margin of gain; and consumers, getting wholesome meats at one half to three fourths the prices they now pay for diseased meats, will buy larger quantities, and so increase the trade.

SLAUGHTERING OF ANIMALS.

It is probable that few persons ever make the inquiry how animals are slaughtered, nor is it likely that many ever imagine that it affects, in any manner, either for good or for evil, the flesh of the animal. In the light of science, however, it makes considerable difference to the consumer how animals are killed. The hunter soon learns to appreciate the importance of this fact, for when his game has been long chased by the hounds he knows that the flesh is thereby rendered soft and flabby, and consequently unwholesome; and we have been told that he not infrequently defers sending the fatal bullet through the heart of the deer thus overheated, even at the risk of entirely losing his game, until it has had an opportunity of slaking its thirst and appeasing its hunger, and until the injurious effects arising from fatigue, fear, and overheat have passed off. What the huntsman has learned by experience, it is to be feared the butcher does not always profit by, excepting so far as it concerns the increased number of dollars he may make in the transaction; the health of the consumers of his products being rarely, if ever, taken into consideration.

But let us see what has been said upon this subject by the ablest investigators in our country. In a lecture delivered by Doctor Slade, Professor of Zoology, of Harvard University, before the Massachusetts State Board of Agriculture, he says: "The animal to be slaughtered should be conducted to the spot selected, quietly, without the use of goad or club, and everything calculated to alarm should be removed. All slaughtering premises should be kept cleansed from blood, and no carcasses be allowed to hang in view. No animal should be allowed to witness the death of another. Trifling as these measures may appear to the professional butcher, they are of vast importance, not only in view of avoiding cruelty, but as affecting the wholesomeness of meat; there being no question as to the effects of torture, cruelty, and fear upon the secretions, and if upon the secretions, necessarily upon the flesh." Sir Francis Head tells us that animals, before being slaughtered, should be kept in a place made clean by every means that can be devised, in which there is a constant flow of water, and should be slaughtered without knowledge and without pain.

Contrast this with the manner in which our butchers slaughter their animals. Go with me to any of the slaughter houses of this city, and let us see what we will learn. As we approach the premises, we observe a number of cattle, weary, dusty and lank, being driven, under a broiling sun, along the street, and into a large field. Here, we are informed, it is the custom of the owners to allow them to remain until the deleterious effects already mentioned have disappeared by food and rest. Then, as required, a number are driven into a large corral; thence a few are driven into a smaller one, at one side of which is a gate leading into a narrow passage-way, capable of containing but a few animals, and which they follow to its termination, more securely built in front and upon either side, and of sufficient capacity to contain two or three good sized animals only. As the requisite number enters, a heavy gate is allowed to descend, thus separating them from the others, and placing them under control. The butcher now ascends to the roof of the compartment, and, with a spear-shaped instrument well poised in his hands, seeks his opportunity, and sends the instrument into the medulla, killing the animal quickly and almost painlessly. As soon as the others are similarly disposed of, a gate in front is raised, and, with a rope and windlass, the animals are hauled into the slaughter house proper, immediately adjoining, where they are soon prepared for market. To all of this, so far, no special objection can be offered; but when it is known that the whole establishment "smells to heaven" from decaying blood and offal, and from the filth and nastiness of hundreds of hogs, wading to their bellies in material much of which is composed of decaying and rotten offal, in an adjoining corral, and that, in the compartment in which the animals are knocked down, the decaying blood of those previously killed lies at least two inches deep, in places, very serious objections are interposed in the interest of humanity as well as of health. Nor is the floor upon which the animals are dressed more cleanly than that upon which they are killed, the condition of both being indescribably filthy and offensive.

But accompany us to the abattoirs of South San Francisco and let us ascertain the manner in which the business of slaughtering animals for the markets is there conducted, as well as the condition of the animals before being slaughtered. The buildings, as is well known, are constructed in shoal-water upon piles, and being located beyond the thickly settled portion of the city but little objection can be offered by those living nearest to them; for, being exposed to the influence of the prevailing south winds they are thereby rendered as free from offensive odors as such institutions can readily be made when reasonable care and cleanliness are adopted. But as we approach them we observe herds of cattle and droves of sheep and hogs being driven along the wharves, over which pass street cars, horses and vehicles of all kinds, as well as hundreds of pedestrians daily. We observe them to be whipped and goaded at times in the most inhuman manner, and to be crowded together and bruised and battered against the wharves and wheels of the vehicles, until they ultimately reach the corrals adjoining the slaughter houses. There, as in the abattoirs at Sacramento, a few are driven into a smaller corral, from which those that are to be butchered immediately are driven into a smaller and narrower compartment, where they are separated from the herd and kept in close quarters by the dropping of a heavy gate in the rear. The noose of a heavy rope is now thrown over the head of one after the other of the animals, and they are wound by the neck by a windlass into the slaughter-house adjoining, the floor of which is reeking with the blood and offal of animals already butchered, and where carcasses are hanging in full view within five feet of them. Frantic and wild with terror, half starved and dying of thirst, as we are told they are at times, they are thus dragged by the necks, their heads being gradually forced to the bloody floor by means of a series of rings, through which the rope passes, writhing and twisting, and not infrequently bellowing in anger and from pain, until an opportunity is afforded the butcher to deal the fatal blow with a hammer or ax. But it occasionally happens that the aim is missed and the blow is received upon the horn, nose, eye, cheek or other part of the head of the animal, infuriating him and exciting him to the wildest frenzy. A few more blows are dealt as opportunity offers, and the animal is battered to death. The condition of the floors of these establishments is filthy in the extreme, rendered so, of course, by the vastly greater number of animals slaughtered there than in the less pretentious ones already referred to. In full view of hundreds of carcasses of animals hanging upon the walls and throughout the slaughter-houses, and in the presence of animals just knocked down, and yet in the throes of death, others are dragged in and similarly disposed of. And it occasionally happens that a powerful animal, when thus frenzied with fear and anger, breaks the rope, and in his rage and fury is thus let loose amongst the dead and dying. And of such are the animal foods which, without proper inspection, are daily sent into our markets; and thus is the beef made with which our tables are supplied.

Much might be said, did time permit, regarding the manner of killing of calves, sheep and hogs, which would perhaps be edifying, if not extremely disgusting, to the consumers thereof; suffice it, however, to say that like objections exist, as in the manner of caring for and slaughtering beef cattle. We had also intended referring to the manner in which poultry, as well as all kinds of fish and game, are prepared for market and there kept until disposed of to consumers, but must defer the consideration thereof for the present at least.

Is it any wonder, in view of what has been said, that diarrheal and other diseases of the stomach and bowels are so frequently prevalent and fatal, and is it any wonder that diseases of the alimentary canal, and those appertaining to the digestive apparatus are productive of more than half of the deaths of the human family? Let any one who has never witnessed the slaughtering of animals visit the abattoirs of any large city and see for himself how beef, pork, veal and mutton are made, and he will have learned why diarrheal and intestinal diseases are so generally prevalent, or at any rate one of the principal causes thereof. And here we are reminded of an inexcusable evil which we witnessed while visiting the abattoirs of South San Francisco, and which we are informed prevails very generally in nearly all such establishments, but which, it is not doubted, exercises a baneful influence upon the youths of our cities. We refer to the habit of allowing small boys to not only witness the slaughtering of animals of all kinds, but even to take, to them, a playful and apparently amusing part in the business; as, for example, the battering of the skulls of the animals that may happen to manifest any evidences of life after the butcher has ceased to strike, or to cut the throat of an animal under similar circumstances. "Wantonness in the child," says Dr. Ellicott, Lord Bishop of Gloucester and Bristol, "if unchecked, is sure to deepen into cruelty or indifference to it in the man." The great need of our country, said Hiram Powers, is more education of the heart. If, therefore, the parents and guardians of these children do not comprehend the great danger to which they are being exposed, and do not realize that the seeds which ripen into cruelty, wantonness, and even murder, are thus being sown, it is clearly the duty of the State to interpose and abate the evil.

EFFECTS OF DISEASED MEATS ON THE SYSTEM.

That the flesh of animals thus transported to market, and slaughtered as we have observed, is necessarily injurious to the health, and productive of much disease and even death, must be patent to every person of observation. But as physicians and those in authority have the best opportunities of witnessing the deleterious effects thereof, let us hear what a few of them have to say. In the report of the Cattle Commissioners for New York we read, "it became apparent to the Metropolitan Board of Health in New York City, that the alarming increase of obstinate and fatal diarrhea in the metropolitan districts was caused by the use of diseased meats." And they further say, "not only do western cattle lose a hundred pounds or more per head in transportation, but the tissues of their entire systems are turned into a flabby, disordered, and feverish condition." The late Professor Agassiz said: "Let me call your attention to the dangers arising from the ill treatment of beef cattle before slaughtering them." "The flesh of mammalia," says Dr. Hamlin, Medical Inspector, in his Notes on Alimentation of Armies, "undergoes great changes by reason of fasting, disturbance of sleep, and long-continued suffering, resulting in not only becoming worthless but deleterious." The Board of Health of Chicago say nearly one half of the beef, pork, and mutton offered for sale in that city was diseased and unfit for food. Much additional testimony might be adduced to the same effect did time permit, or were it at all necessary. Not only is such food dangerous to the life of human beings, but even hogs die after eating of the flesh, blood, or entrails of animals thus diseased during transportation, or overheated from any cause, and slaughtered before being allowed an opportunity of regaining the normal, healthy condition.

But, as illustrative of one of the dangers to which the consumers of animal foods are subjected, an instance occurred in our neighborhood which is well worthy of being recorded. Mr. George Swingle, a well-to-do farmer, living near Davisville, Yolo County, informs us that a disease, which he has reason to believe to have been pleuro-pneumonia, prevailed amongst his cattle during the past Winter, from which about fifty sickened and died, and before he became aware of the nature of the disease, and its intensely fatal effect upon his hogs when the flesh of the dead animals was eaten by them, between seventy and eighty of them died very suddenly. And he informs us that it made no difference how much or how little of the flesh was eaten, excepting in the duration of the fatal sickness—all perished. Can it be doubted that the flesh of such animals occasionally finds its way into our markets? Or is it improbable that some of the peculiar forms of disease terminating fatally, and which sometimes baffle the skill of the most eminent medical men, are due to just such causes?

THE REMEDY FOR THESE EVILS.

That a speedy and potent remedy for these evils should be sought and rigorously applied, will, of course, be voiced by all, by owners of abattoirs and railroads as well as by the public, for it is not doubted that all are largely ignorant of the magnitude and dangers thereof. But to be effective, it must be compulsory, for money is king; and unless statutory restrictions are enacted, there is much fear that the mere knowledge of the existence of the evil will but partially restrict it. It is, therefore, hoped that our legislators, in their wisdom, will adopt the necessary legislation at the earliest opportunity. Inspectors should be appointed whose duty it shall be to see that transportation cars are properly constructed and ventilated; that the animals transported shall not be over-crowded, and that during transit they shall be allowed an abundant supply of fresh and pure water at proper intervals, and that they be well fed; that the owners of cattle shall not be allowed to expose their animals for sale, or be butchered until after the lapse of sufficient time to afford them an opportunity of regaining the loss of weight sustained during transportation, and until they shall have fully recovered from the effects arising from fatigue, fear, anger, heat, confinement, change of location, and all other influences which tend to render their flesh soft, flabby, feverish, and unwholesome.

Lest, however, it be inferred, from what has been said, that the evils alluded to are universal, we desire to say, that it is not denied that a reasonable time is *generally* allowed animals in which to recuperate before being slaughtered; but it is asserted that a *sufficient* time for *full* restoration is rarely afforded them; for not infrequently are they slaughtered almost immediately after a long and fatiguing journey, and under the circumstances and in the condition stated.

The State of California in its wisdom has seen fit to place in the hands of its Governor the appointment of a State Board of Health, and has defined its duties, not the least important of which is, perhaps, embraced in the subject under consideration; yet, further and more definite legislation is required. And as the great body of the people learn to realize more fully than they do that the State should exercise supervision over the public health, and that many of the conditions which affect it should be placed more directly and fully under their control, because they are preventable only through their superior opportunities and special training, more attention will be paid to sanitary science, and the lessons which it teaches, and wiser legislation will be enacted, whereby such evils as those referred to will be remembered only as having actually existed within the memory of the narrator, and whereby such conditions as tend to cause sickness and premature and unnecessary death, with its long train of ultimate evil to individuals and to the State, will be forever removed. But, before concluding these crude and hastily written observations, let me quote what Mr. George T. Angell, President of the Massachusetts Society for the Prevention of Cruelty to Animals, in an admirable paper on the protection of animals, published in the Journal of Social Science for July, 1874, says, "For all these wrongs, which I have enumerated, what is the remedy? First, better transportation. The Jewish Rabbi goes to our markets and selects what appears to be a healthy animal. He stands at the slaughter-house while it is being slaughtered and dressed. During the process, he carefully examines its internal organs, and if he finds the slightest trace of disease, passes it over to the Christian. When public opinion shall demand the same inspection of animals, both before and after they are killed, now practiced in Continental European cities, and by the Jews, so far as I am informed, everywhere, and the Christian Inspector will stand at our cattle markets, side by side with the Jewish Rabbi, to condemn, and cause to be destroyed the meats of every diseased animal, then animals will be brought to our markets without cruelty, and the Christian will eat as good meat as the Jew."

ON INTOXICATING DRINKS, INEBRIATE ASYLUMS, ETC.

By H. Gibbons, M. D.

Of all the many causes of disease and suffering in the human family, no one can begin to compare with the use of intoxicating drinks. It may well be questioned whether this one cause is not more than equal to all others combined. Certainly it is so, if we include effects, both physical and moral. I mention the *use* rather than the abuse, because the one so generally tends to the other. Indeed, the use by persons in health is in itself an abuse. Alcoholic drink in every form is a medicine; and everybody knows that medicines are not only unnecessary to persons in health, but hurtful. Besides, the habitual use impairs and destroys that sensibility to the effect on which the medicinal value depends. It follows, that every person who drinks habitually, cuts himself off, in greater or less degree, from whatever good they might do him in case of sickness.

A large class of diseases engendered by filth or propagated by contagion, are set down as preventable. All over the civilized world, sanitarians are laboriously engaged in warding them off and arresting their progress. By such labors has the average duration of human life been considerably prolonged in the present century. Meanwhile, we cherish in our midst the most perniciously infectious and the most fatally contagious of all maladies, to wit, the drinking habit; which is quite as preventable as other forms of pestilence. To prevent entirely the accumulation of disease-breeding filth—to stamp out from our country the scourge of smallpox through the prophylactic influence of vaccination—to ward off altogether the scourges of cholera and yellow fever by quarantine and other means—involve practical impossibilities as great as the complete extirpation of the drinking habit. Were we a nation of abstainers, entirely free from the curse but fully cognizant of its evils, and should we, under these circumstances, behold it steadily approaching us from abroad in all its dire proportions, with one voice and one sentiment the might of the nation would be invoked to prohibit contact and contamination, and to bar it out as with gates of iron. But unfortunately it has stolen upon us so unawares as to become interwoven with trade and with social life, and incorporated with the very existence of business and society.

The evils growing out of the use of strong drink are too patent and pervading to require presentation in this brief report. No man with a spark of patriotism or humanity in his bosom can fail to recognize them, and to long for a remedy. At this moment the people of different nations are stirred up on the subject more than at any former time. Considerate and thoughtful minds, professional men, philanthropists, and statesmen, in England, France, Germany, and other countries, have awakened to the magnitude of the subject, and disclosed the alarming fact that the drinking habit is sapping the foundations of society, deteriorating and degrading the race in body and mind, impairing the national strength, and endangering the vitality, and in some cases the very existence of nations.

All experience demonstrates that the attempt to break up the drinking habits of a people by moral agencies is futile. Individual exceptions do not invalidate the rule. When men are once enslaved by the habit, it will cling to them for life, and drag them down to shame and death. There can be no general reform, unless the means of indulgence be completely removed. The temptation to indulge is irresistible when opportunities and temptations abound as at present, and every step in the pathway of the slave of habit brings him face to face with the tempter.

All civilized nations recognize the evils and dangers of intemperance, and all have attempted to restrain the drinking habit. Laws innumerable have been devised for that purpose, but without success. What wonder, under these circumstances, that the countless array of innocent sufferers throughout the land, fathers and sons, brothers and sisters, mothers and daughters, wives and husbands of the great army of three or four hundred thousand wretched drunkards within our national limits—what wonder that they, in anguish of spirit, should resort to extreme measures in order to protect themselves and redeem their fallen relatives, and save the rising generation, by endeavoring to bar out the enemy by prohibitory legislation!

Whether the substitution of wine for distilled liquors, as many good citizens contemplate through the general cultivation of the vine in the State, will tend to diminish intemperance, is not so much a question, as whether the people of California can be induced to make the change. In certain European countries where the peasantry cannot purchase or procure anything but the cheapest and poorest wines, we are told that drunkenness does not prevail. But here in California we have a population very different from that of Europe, and, however well trained in wine drinking, sooner or later brandy would be apt to follow. This is the law of nature and of habit. According to biblical history the wine countries of the East were terribly cursed with drunkenness. In those days there were no stronger drinks, for the art of distillation was unknown. That the still so generally takes its stand by the side of the wine press in California, does not favor the prospect of abolishing the use of the stronger drinks by substituting wine. Nevertheless, the wine interest has become so important in our State, so incorporated with the business life of the community, that there appears no alternative but to submit to the experiment. Fortunate will it be for the State if the expectations of wine-growers should be realized in this respect.

Inebriate asylums are doing some good by reforming a few individuals here and there. But the tendency to relapse under temptation is so strong as to weaken the public confidence in the permanency of such reformations, so long as temptations abound as they now do. At the best, however, the reformatory action of a multitude of asylums would be but a drop in the bucket. A large proportion of our boys are marching forward close on the heels of the full-grown drunkards, and ready to take their places. As benevolent institutions, asylums for inebriates are worthy of all praise. But they can make no sensible impression on the evil in mass.

Opium smoking has excited alarm among our people, and led to very stringent prohibitory legislation in certain localities. Its mischievous effects are well calculated to awaken active hostility against the extension of the vicious habit. But what are the evils of opium smoking, and the use of opium in all forms, on individuals and on the commonwealth, compared with the evils growing out of strong drink? It is not uncommon to see fifty drunkards standing at the bar of the Police Court of the metropolis on Monday morning; in fact, the number is often much larger. I have resided in San Francisco upwards of thirty-two years, and have never known of a solitary individual thus arraigned on account of exhibiting the effects of opium. More than this, I have never known or heard of one charged with a criminal offense instigated by opium; and yet we drag a man before a criminal tribunal for visiting a place where opium is smoked, whilst we cover with the protecting shield of the State thousands upon thousands of drinking places which feed our Courts and jails and penitentiaries from day to day and from year to year with a great and a growing stream of malefactors!

From a financial standpoint the presentation of the subject is equally striking. The amount of money spent annually for stimulating drinks by the people of the United States has been ascertained with reasonable accuracy. The share of California in this expenditure is not less than twelve millions of dollars. This is a voluntary tax paid for a harmful luxury. But what is the amount of the involuntary tax imposed as a consequence? From one end of the State to the other an earnest outcry is heard against excessive taxation. Men say the percentage must be reduced to one per cent of the valuation of property, or some other figure, and candidates are required to pledge themselves for the reduction, even at the expense of our educational system. A reduction of five per cent would be hailed with delight; of fifteen or twenty per cent, would fill the air with hosannas. Now, it would be easy to show that if all the varied noxious influences of strong drink were eliminated from the tax book, it would take fifty per cent from the tax bills. Very few of our citizens trouble themselves about the enormous costs to which they are annually subjected on account of the large proportion of the expenses of Courts, jails, penitentiaries, and other prisons, almshouses and other public institutions, growing out of strong drink. Apart from moral and humane considerations, it might be supposed that the financial relations of the subject alone would be sufficient to impel the taxpayers of the State to rise in mass, and, by a determined and mighty effort, to throw off the shackles which they have long borne so passively and thoughtlessly.

NAMES OF CORRESPONDENTS.

The State Board of Health desires again to express its gratitude to the correspondents who have so kindly volunteered their reports during the past year, and have so materially aided in the preparation of the present report:

Dr. J. L. Meares	San Francisco.
Drs. E. H. Woolsey and J. R. Bradway	Oakland.
Dr. A. F. Hudson	Stockton.
Dr. C. A. Ruggles	Stockton.
Dr. C. L. Anderson	Santa Cruz.
Dr. W. D. Rodgers	Watsonville.
Dr. F. Delmont	San Buenaventura.
Dr. C. B. Bates	Santa Barbara.
Dr. H. S. Orme	Los Angeles.
Dr. J. B. Winston	Los Angeles.
Dr. W. Finlaw	Santa Rosa.
Dr. C. A. Kirkpatrick	Redwood City.
Dr. B. S. Young	Santa Rosa.
Dr. H. C. Crowder	Williams.
Dr. M. C. Parkison	Antioch.
Dr. F. C. Durant	Folsom.
Dr. J. M. Briceland	Shasta.
Dr. A. B. Caldwell	Marysville.
Dr. J. S. Muir	Hanford.
Dr. Alemby Jump	Downieville.
Dr. H. J. Crumpton	Lakeport.
Dr. Thomas Ross	Woodland.
Dr. R. F. Rooney	Colfax (now of Auburn).
Dr. W. R. Fox	San Bernardino.
Dr. S. P. Crawford	Stockton.
Mr. Horsch, Secretary of Board of Health	San Francisco.
Dr. W. C. Jones	Grass Valley.
Dr. W. J. G. Dawson	St. Helena.
Dr. M. B. Pond	Napa City.
Dr. James Frost	Vallejo.
Dr. Lewis Leach	Fresno City.
Dr. G. A. Shurtleff	Stockton.
Dr. E. T. Wilkins	Napa.
Dr. H. N. Rucker	Merced.
Dr. C. W. Harvey	Dixon.
Dr. C. W. Breyfogle	San José.
Dr. C. C. Mason	Chico.
Dr. G. W. West	Red Bluff.
Dr. R. M. Hunt	Nevada City.
Dr. G. M. Wells	Sonoma.
Dr. C. S. Bradford	Elk Grove.
Dr. H. P. Miller	Davisville.
Dr. H. W. A. Worthen	Placerville.
Dr. Benjamin Cory	San José.
Dr. George A. White	Sacramento.
Dr. S. B. P. Knox	Santa Barbara.
Dr. T. C. Peacock	San Bernardino.
Dr. R. Parkhurst	San Luis Obispo.
Dr. Benjamin Knight	Santa Cruz.
Superintendent County Hospital (name not given in report)	Los Angeles.

SPECIAL REPORT TO THE STATE BOARD OF HEALTH.

To the President and Members of the State Board of Health:

By virtue of the authority conferred, and in response to the following circular, urgently requesting the coöperation of the State Board of Health of California in furtherance of the object stated, I attended the sessions of the American Public Health Association at Indianapolis, on the 18th ult., and respectfully submit the following report:

The purpose of the meeting was justly regarded by the members of the State Board as being one of importance, likely, if perfected, to exert a salutary influence throughout the country, and of awakening a new and lively interest in the subject of public sanitation. One of its direct results would be to exhibit the progress made in sanitary science, to display the practical fruits of the labors of the sanitarian for the promotion of the public health. It would be likely to reach the people in an attractive way, to draw attention to the subject more effectually than could possibly be done by the most elaborately written essays or arguments.

We, in California, have been so long isolated from the great body of our co-laborers in sanitary work, shut out by distance from active participation with them, and compelled to rely mainly upon our own resources and our own convictions of duty, that the present seemed a most favorable opportunity for extending to them the right hand of fellowship, to exhibit a disposition to coöperate with them in measures tending to promote the great interests in which we are mutually engaged, and to profit by their experience.

At the Convention whose sessions have recently closed, the leading sanitarians of the United States were largely represented, and though the number present was said not to have been as great as in some previous years, the general sentiment of those capable of judging was, that at no time in the history of the Association had its papers been marked by more ability or its discussions by greater earnestness and judgment than at this.

Your committee is compelled to confess to some disappointment, however, in the result, so far as relates to the special purpose of his mission. In this disappointment, others present equally shared. The particular object of the invitation, as given in the circular, seemed to be sufficiently clear, and was so understood by other delegates present. It was inferred that committees, preliminary to final action upon the subject of a "National Medical and Sanitary Exhibition," had been appointed, and had had the project under consideration, and that it only remained to receive the coöperation of the several State Boards of Health, and of others interested, and to perfect the details. Such was the legitimate deduction from the communication. The latter, in fact, gives the "directory" of one of these committees.

It appeared, however, that no such preliminary action had been had, and that the circular, though its objects met with general approval, had been premature in the shape in which it had been issued, and, to a very unfortunate degree, irresponsible.

One good result ensued. It created discussion; it brought the subject squarely before the leading sanitarians present at the session of the committee, and it ended by decided action in the Association, having in view the accomplishment of this object in 1884. Though no definite plan was decided upon, and no authoritative expression of views announced in relation thereto, it seemed to be the impression of many that the proposed exhibition would be held in the City of Washington, in connection with that of the Museum of Hygiene, established by the Navy Department, and which has already, by the aid of congressional appropriations, become an object of interest.

It is to be hoped that California will respond favorably in behalf of this undertaking, that it will unite with the States east of the Rocky Mountains, in making this proposed exhibition worthy of the cause and of the nation, a fitting display of the great advances made in sanitary science, and in the means preservative of the public health, to which the recent history of the labors of the sanitarian bears witness. In this advancement California has not been idle, and will be able, under proper encouragement, to make a good report.

It is respectfully suggested that the Legislature be asked for a small conditional appropriation to enable the State Board of Health, at the proper time, to coöperate with other State Boards and with the American Public Health Association, in the promotion of an object, the results of which must be greatly advantageous to the State and to the interests of public sanitation.

Respectfully submitted,

F. W. HATCH,
Secretary of State Board of Health.

SACRAMENTO, CAL., November 8, 1882.

Jersey City, N. J., September 1, 1882.

To F. W. Hatch, M. D., Secretary State Board of Health of California:

Dear Sir: The undersigned would earnestly request your Board to appoint one Commissioner and an alternate to meet Commissioners appointed by the National and various State Boards of Health of the United States, together with Commissioners appointed by the American Public Health Association, said Commissioners to assemble at Indianapolis, Indiana, on Wednesday, October 18, 1882, at nine o'clock, A. M., to take into consideration the question as to the best course to be pursued, which may result in holding a National Medical and Sanitary Exhibition in the year 1883.

You will oblige by informing us at your earliest convenience of the action taken by your Board of Health in the matter.

Yours very respectfully,

Philip S. Wales, M. D., Washington, D. C.
Chas. P. Daly, New York.
Howard Crosby, D. D., New York.
Chas. F. Chandler, Ph. D., New York.
Lewis A. Sayre, M. D., New York.
Willard Parker, Sr., M. D., New York.
A. R. Leeds, Ph. D., Hoboken, New Jersey.
Joseph H. Raymond, M. D., Brooklyn, N. Y.
Edward S. Wood, M. D., Boston, Mass.
Jacob S. Mosher, M. D., Albany, N. Y.
Jos. G. Richardson, M. D., Philadelphia, Pa.
E. V. Stoddard, M. D., Rochester, N. Y.
Nelson Nivison, M. D., Syracuse, N. Y.
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Henry B. Baker, M. D., Lansing, Mich.
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Jas. E. Reeves, M. D., Wheeling, W. Va.
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A. N. Bell, M. D., New York.
J. C. Bayles, New York.
W. A. Ewing, M. D., New York.
Jas. Gallatin, New York.
Edward S. Philbrick, C. E., Boston, Mass.
Geo. E. Waring, Jr., C. E., Newport, R. I.
H. J. Bowditch, M. D., Boston, Mass.
J. G. Thomas, M. D., Savannah, Ga.
S. E. Chaille, M. D., New Orleans, La.
C. E. Lockwood, M. D., New York.
Gustavus Devron, M. D., New Orleans, La.

WM. H. NEWELL, M. D.,
Corresponding Secretary.

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Gustavus Devron, M. D.	President of Sanitary Council of the Mississippi Valley.
Wm. H. Newell, M. D.,	Secretary of Council of Public Analysts and Chemists of New Jersey.

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